

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



Reserve  
aTC425  
.M3F5

Department of  
Agriculture

Soil  
Conservation  
Service

Bismarck  
North Dakota

# Flood Hazard Analyses Maple River in Cass and Ransom Counties

Prepared for the Maple River  
Water Management Board

In Cooperation with the Maple River Water  
Management District, Cass County Soil  
Conservation District, and the North  
Dakota State Water Commission

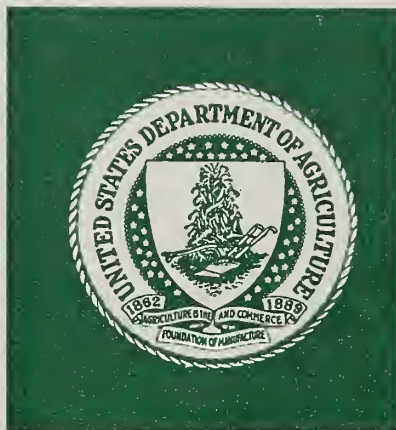


July 1981

AD-33 Bookplate  
(1-63)

**NATIONAL**

**A  
G  
R  
I  
C  
U  
L  
T  
U  
R  
A  
L**



**LIBRARY**



24500  
FLOOD HAZARD ANALYSES,  
MAPLE RIVER IN  
CASS AND RANSOM COUNTIES: #10  
INCLUDING THE CITIES OF  
MAPLETON AND ENDERLIN, NORTH DAKOTA / #C

Prepared by

United States Department of Agriculture,  
Soil Conservation Service  
Bismarck, North Dakota

For the

Maple River Water Management Board

In cooperation with the

Maple River Water Management District,  
Cass County Soil Conservation District  
and the  
North Dakota State Water Commission,

U.S. DEPT. OF AGRICULTURE  
NATIONAL AGRICULTURAL LIBRARY

FEB 16 1982

CATALOGING = PREP.

July 1981



## F O R W A R D

This report defines the flood characteristics of the Maple River and some of its tributaries in the vicinity of Cass and Ransom Counties, North Dakota. Land uses along the river are residential, commercial, agricultural, recreational and industrial. Despite moderate agricultural and urban damage by the floods of April 1948, April 1950, and April 1969, there is continuing pressure for more intensive development of the flood plain.

This cooperative report was prepared for the guidance of local officials in planning land use and regulating development within the flood plain. The 10-, 50-, 100- and 500-year were the four frequency floods selected to represent degrees of major flooding that could occur in the future. The 100-year <sup>1/</sup> and the 500-year <sup>2/</sup> frequency floods should be carefully considered in planning land use and development in the flood plain. Potential flooded areas are defined by the flood hazard photomaps that show the approximate areas subject to inundation. Flood profiles show the water depths relative to the streambed and flood elevation across the width of the valley. Typical valley cross sections are presented to indicate ground levels across the valley and the overlying flood depths. The flood profiles and flooded area data are based on existing conditions.

The information in this report does not imply any federal authority to zone or regulate use of the flood plains; this is the responsibility of the state or local governments. The report provides technical data needed for adoption of local land use controls to regulate flood plain development, with consideration for environmental values, which would prevent intensification of flood losses. Since it identifies flood problems, the report will stimulate

<sup>1/</sup> A flood which has a 1% chance of occurrence being equaled or exceeded in any year (also called "base" flood).

<sup>2/</sup> A flood which has a 0.2% chance of occurrence being equaled or exceeded in any year.

the development of other flood damage reduction techniques such as flood control structures, removal of obstructions and flood proofing which might be used in an overall Flood Plain Management Program.

The assistance and cooperation of the Maple River Water Management District, Cass County Soil Conservation District, North Dakota State Water Commission and private citizens in carrying out this study is appreciated.

## MAPLE RIVER FLOOD HAZARD ANALYSES

TABLE OF CONTENTS

	<u>Page No.</u>
Introduction. . . . .	1
Description of Study Area . . . . .	3
Flood History . . . . .	6
Flood Potential . . . . .	6
Flood Plain Management. . . . .	7

APPENDICES

A - Flood Hazard Area Index Map and Photomaps . . . . .	22-116
B - Flood Profiles. . . . .	117-136
C - Selected Cross Sections . . . . .	137-140
D - Discharge-Elevation-Frequency Data. . . . .	141-155
E - Investigations and Analyses . . . . .	156
F - Bridges and Crossings . . . . .	159-185
G - Glossary. . . . .	186
H - Bibliography and References . . . . .	200

TABLESTABLE 1

Elevation Reference Marks. . . . .	189-199
------------------------------------	---------

TABLE OF CONTENTS - continued

FIGURES

	<u>Figure No.</u>
Vicinity Map - Maple River, Buffalo Creek, Buffalo Tributary, Wheatland Channel, and Swan Creek. . . . .	1
Flooding from the Maple River in the vicinity of Mapleton, ND (April 1962 snowmelt runoff). . . . .	2
Flooding from the Maple River. Looking North to the town of Mapleton, ND from Interstate 94. (April 1962 snowmelt runoff). . . . .	3
Flooding in the town of Mapleton, ND from the Maple River. (June 1975 rainstorm.) . . . . .	4
Flooding from Maple River in the vicinity of Durbin, ND. (June 1975 rainstorm.) . . . . .	5
Flooding from the Maple River at approximate River Mile 69.65. (June 1975 rainstorm.) . . . . .	6
Flooding from the Maple River at approximate River Mile 84.13. (June 1975 rainstorm.) . . . . .	7
Flood Stages at River Mile 13.51 . . . . .	8
Flood Stages at River Mile 32.55 . . . . .	9
Flood Stages at River Mile 2.80. . . . .	10
Flood Stages at River Mile 13.55 . . . . .	11
Flood Stages at River Mile 38.09 . . . . .	12
Flood Stages at River Mile 63.45 . . . . .	13
Flood Stages at River Mile 32.56 . . . . .	14
Flood Stages at River Mile 45.84 . . . . .	15
Flood Stages at River Mile 80.90 . . . . .	16
Flood Stages at River Mile 87.43 . . . . .	17
Flood Stages at River Mile 69.65 . . . . .	18
Flood Stages at River Mile 84.13 . . . . .	19



TABLE OF CONTENTS - continued

FIGURES

	<u>Figure No.</u>
Flood Stages at River Mile 96.18 . . . . .	20
Flood Stages at River Mile 107.36 . . . . .	21
Flood Stages at River Mile 93.84 . . . . .	22
Flood Stages at River Mile 105.06. . . . .	23
Flood Stages at River Mile 114.37. . . . .	24
Flood Stages at River Mile 127.44. . . . .	25
Flood Stages at River Mile 110.58. . . . .	26
Flood Stages at River Mile 120.87. . . . .	27
Flood Stages at River Mile 150.11. . . . .	28
Flood Stages at River Mile 159.14. . . . .	29
Flood Stages at River Mile 143.01. . . . .	30
Flood Stages at River Mile 154.57. . . . .	31
Flood Stages at River Mile 162.31. . . . .	32
Perspective and Cross Sectional View of the Structure of a Typical Regulatory Flood Plain. . . . .	33





## INTRODUCTION

The purpose of this cooperative study is to identify flood hazard areas along the Maple River, Cass County, North Dakota, and provide technical data necessary to implement an effective local flood plain management program. Increasing pressure to develop flood plain areas is becoming apparent as competition for land grows. Increasing land values and scarcity of undeveloped areas in which to expand often result in flood plain encroachment. Nonregulated development and encroachment frequently result in reduced flood conveyance, thereby increasing flood stages and overall flood losses.

Since the advent of federal laws governing financing within flood plains, many financial institutions are reluctant to lend and federal agencies cannot finance projects in these communities, unless there is assurance that the area is flood free or can be protected.

It is imperative that flood plains in agricultural areas be defined so that the planning and location of farmsteads can be controlled and also to identify those areas where flood control measures can be applied.

This flood hazard study was requested by the Maple River Water Management District and the Cass County Soil Conservation District, through the North Dakota State Water Commission, under the 1972 Joint Coordination Agreement with the Soil Conservation Service. Priorities regarding such studies are set by the North Dakota State Water Commission. The study was carried out in accordance with the August 1978 Plan of Study between the Maple River Water Management District, Cass County Soil Conservation District, the North Dakota State Water Commission and the Soil Conservation Service.

The study begins at the junction of the Maple River and the Sheyenne River (River Mile 0.0) and proceeds upstream along the Maple River for a River Mile distance of 170.76 miles to approximately Steele County. Three communities are located within the study area, Mapleton and Enderlin, North Dakota which are incorporated cities and Durbin, North Dakota which is an unincorporated city. There are parts of four tributaries to the Maple River included in the study: Buffalo Creek, Buffalo Tributary, Swan Creek and Wheatland Channel.

The 1975 North Dakota Legislature passed the "Extra Territorial Jurisdiction Law", which provides communities with zoning authority outside the corporate limits. The extent of the area of control is dependent on population. For the cities of Enderlin and Mapleton, North Dakota, an option up to  $\frac{1}{2}$  mile is permissible. The extra territorial jurisdiction for the unincorporated City of Durbin is unknown.

Flood Hazard Analyses are carried out by the SCS as an outgrowth of recommendations in A Report by the Task Force on Federal Flood Control Policy, House Document No. 465 (89th Congress, second session), especially Recommendation 9(c), "Regulation of Land Use".

Authority for carrying out this study is provided by Section 6 of Public Law 83-566, which authorizes the USDA to cooperate with other federal, state and local agencies to make investigations and surveys of the watersheds of rivers and other waterways as a basis for coordinated programs. In carrying out this study, the SCS is responsive to Executive Order No. 11988, dated May 24, 1977, which directs that "all executive agencies responsible for programs which entail land use planning shall take flood hazards into account

when evaluating plans and shall encourage land use appropriate to the degree of hazard involved."

Potential users of flood plains should base planning decisions upon the advantages and disadvantages of each location. Knowledge of flood hazards is not widespread and consequently the managers, potential users, and occupants cannot always accurately assess these risks. In order for a local flood plain management program to be effective in the planning, development and use of flood plains, it is necessary for SCS to:

1. Assist state and local units of government by preparing appropriate technical information and interpretations for use in their flood plain management programs.
2. Provide technical services to managers of flood plain property for community, industrial and agricultural uses.
3. Improve basic technical knowledge about flood hazards in cooperation with other agencies and organizations. .

This report contains aerial photomaps, high water profiles and typical valley and channel cross sections indicating the extent of flooding which can be expected on the Maple River. Four separate floods were analyzed, the 10-, 50-, 100- and 500-year frequency events.

The North Dakota State Water Commission or the Soil Conservation Service will, upon request, provide technical assistance to federal, state and local agencies and organizations in the interpretation and use of the information developed in this study.

#### DESCRIPTION OF STUDY AREA

The area within the Maple River Flood Hazard Analyses is located in the Water Resource Council's Missouri Region and Subregion 09020205.



The climate in the area of the Maple River is typical of the Great Plains with warm summers and cold winters. The frequent passage of weather systems across the area brings a wide variety of weather in all seasons and wide variations in temperatures from day to day and month to month. Summers are warm and pleasant with sunny days and cool nights. Maximum temperatures during the three summer months average 81 degrees. Temperatures of 90 degrees or more occur on an average of 20 days per year ranging from 4 in the coolest summers to 41 in 1936. Temperatures during the winter months of December, January, and February average about 11.6 degrees, but maximum temperatures exceed 32 degrees on 23 days during these months. During outbreaks of cold from arctic air, temperatures drop to zero or below on an average of 49 days each.

The annual precipitation in the area is 20.6 inches, of which about 80 percent falls in the growing season, April through September; about 47 percent falls in the months of May, June, and July.

The Maple River has its headwaters in the glacial drift prairie about 4 miles south of Finley, North Dakota, an area characterized by flat to gently rolling ground moraine. As the Late Wisconsinan glacier retreated, meltwater trenches were formed as ice-marginal streams which crossed the ground moraine surface. The Maple River flows south in a small meltwater trench across Steele County and continues from north to south across the west side of Cass County to the city of Enderlin, Ransom County. The valley widens across Cass County and the stream channel meanders across the floodplain. At Enderlin, the meltwater trench is about 50 feet deep and a half mile wide and makes an abrupt change in direction to the east for about 3 miles. Here it turns northeast and flows through the Maple Delta deposits and along the north edge of the Sheyenne Delta which were deposited in former glacial Lake Agassiz. The northeastward flowing Maple River is deeply entrenched in the

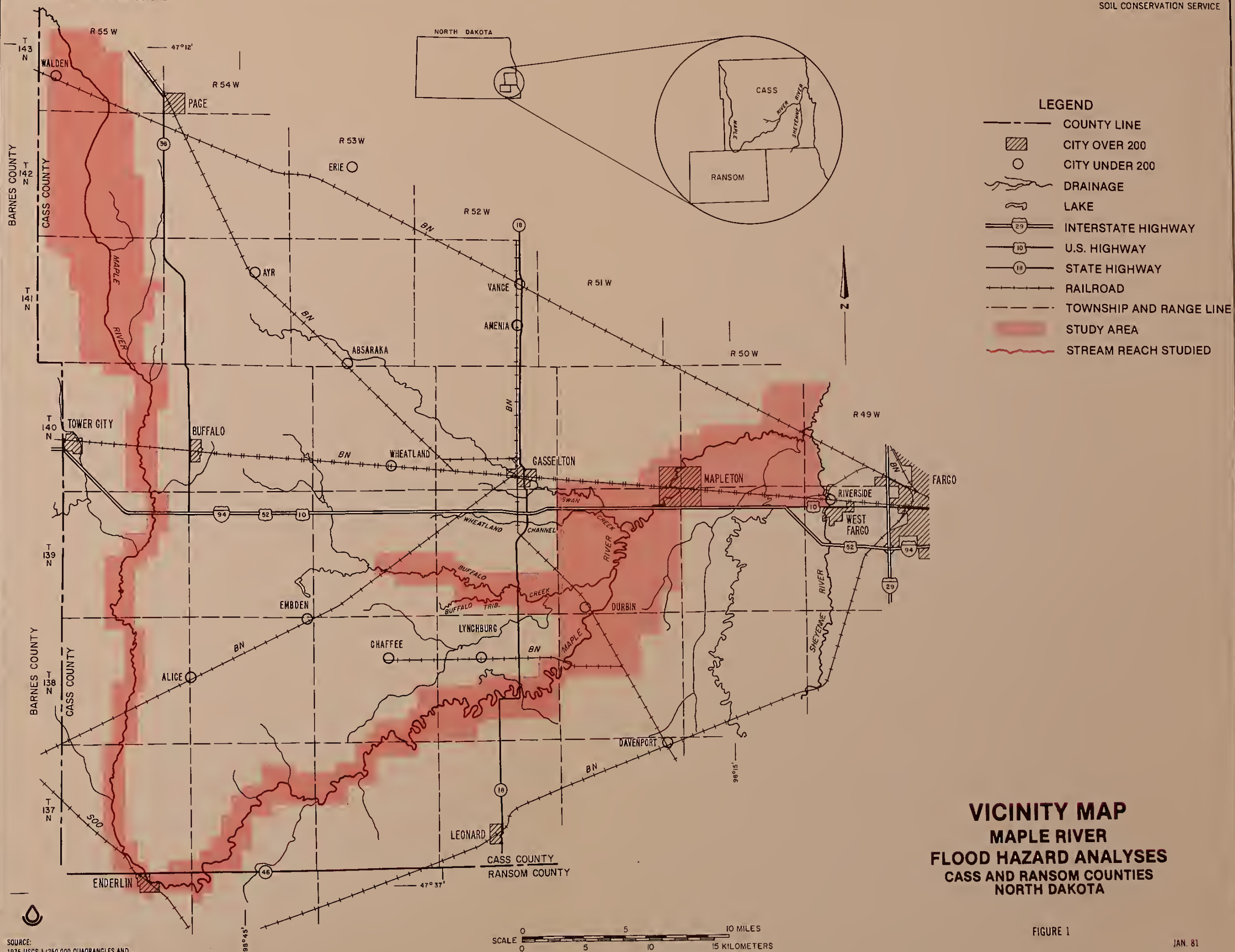


FIGURE 1





Maple Delta. As the Maple River leaves the Maple Delta it meanders across a 7-mile wide belt of stratified gravel, sand, silt, and clay shore deposits which were formed on a wave-eroded till surface. After the channel leaves the prominent Campbell beach it continues its meandering course across the nearly level, featureless glacial Lake Agassiz lacustrine plain. About 5 miles southeast of Casselton it is joined by the Swan Buffalo Creek. The Maple River continues its meandering course until it joins the Sheyenne River about 4 miles north of West Fargo.

Generally the Drift Prairie has medium textured loam and clay loam soils. The Delta and shore deposits are droughty light textured sandy loam soils with the heavy silty clay soils being formed on the lacustrine sediments of glacial Lake Agassiz.

#### FLOOD HISTORY

Most of the flooding occurs in the spring of the year, usually in April. The large floods occur from spring snowmelt runoff due to winter accumulation of snow and frozen soil conditions. Recent large floods from snowmelt runoff occurred in April 1948, April 1950, April 1969 and April 1979. Floods of earlier years occurred in 1882 (approximate 100-year frequency) and 1897 (frequency unknown). Recent large floods occurring from excess rainfall occurred in July 1962 and July 1975. Flood damage consisted of urban, road and bridge, and agricultural damage. Since these floods, larger openings have been provided through some of the county roads and state highways. These improvements decreased flood stages only slightly throughout the study area.

#### FLOOD POTENTIAL

Potential flood areas within the Maple River Watershed include primarily urban agricultural and open space land. A limited number of homes and

businesses along the Maple River in Durbin, Enderlin and Mapleton are subject to inundation during a 100-year frequency flood event. Possible flood damages include scoured land, washed out fences, weakened roads and bridges, watersoaked buildings and personal property, and scattered debris.

Restrictive bridges, culverts, dense vegetation and an inadequate channel all contribute to the severity of potential flooding within the flood plain.

Floodwaters in the Maple River rise at a slow rate. Duration of flooding normally can be expected to be within the range of 2 to 5 days for each notable flood event. Flood control improvements are recommended and should be considered in the future (see Recommendations).

A 500-year frequency flood within the study area will inundate approximately 86,650 acres and a 100-year frequency flood will inundate some 77,500 acres. A total of 206.52 river miles were studied. The breakdown of mileage is as follows: Maple River 170.76 miles, Buffalo Creek 23.96 miles, Buffalo Tributary 2.67 miles, Swan Creek 5.80 miles, and Wheatland Channel 3.33 miles. There is major flooding within the corporate limits of the cities of Mapleton and Enderlin. Major flooding also occurs in the unincorporated city of Durbin.

#### FLOOD PLAIN MANAGEMENT

With this flood hazard information available the city and county can minimize future flood losses by planning for the protection, wise use and orderly development of the flood plain area. The overall plans of the community for industrial, commercial and residential areas, for streets, utilities, parks and schools must be coordinated with the need to temporarily store (if possible) and convey floodwaters.

## MAPLE RIVER

FIGURE 2



FLOODING FROM THE MAPLE RIVER IN THE VICINITY OF MAPLETON, NORTH DAKOTA. (APRIL 1962 SNOWMELT RUNOFF.)

FIGURE 3



FLOODING FROM THE MAPLE RIVER. LOOKING NORTH TO THE TOWN OF MAPLETON, NORTH DAKOTA FROM INTER-STATE 94. (APRIL 1962 SNOWMELT RUNOFF.)



## MAPLE RIVER

FIGURE 4



FLOODING IN THE TOWN OF MAPLETON, NORTH DAKOTA  
FROM THE MAPLE RIVER. (JUNE 1975 RAINSTORM.)

FIGURE 5



FLOODING FROM MAPLE RIVER IN THE VICINITY OF  
DURBIN, NORTH DAKOTA. (JUNE 1975 RAINSTORM.)

## MAPLE RIVER

FIGURE 6



FLOODING FROM THE MAPLE RIVER AT APPROXIMATE  
RIVER MILE 69.65. (JUNE 1975 RAINSTORM.)

FIGURE 7

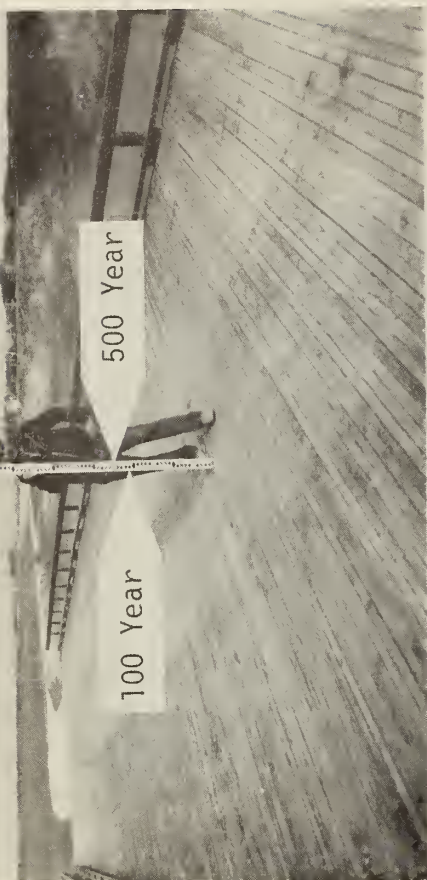


FLOODING FROM THE MAPLE RIVER AT APPROXIMATE  
RIVER MILE 84.13. (June 1975 RAINSTORM.)



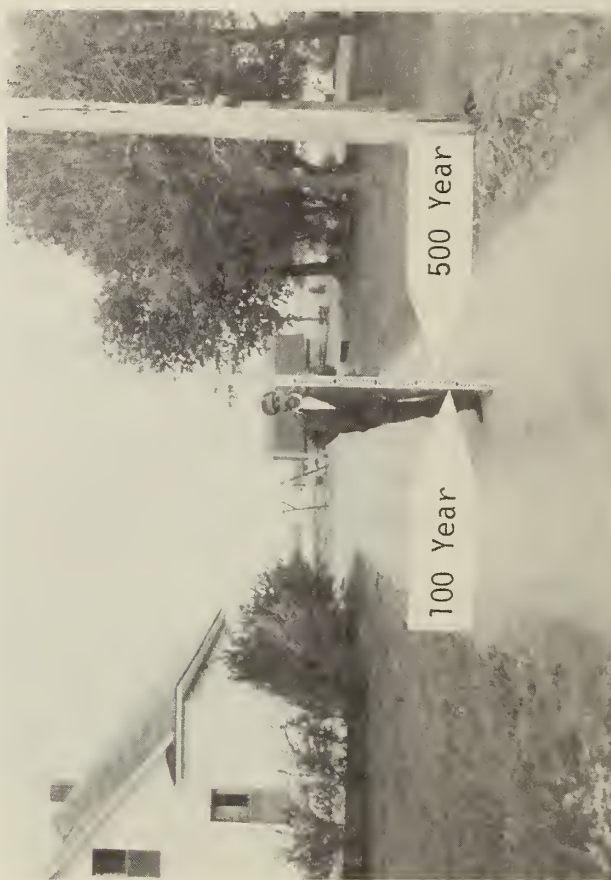
# MAPLE RIVER

FIGURE 8



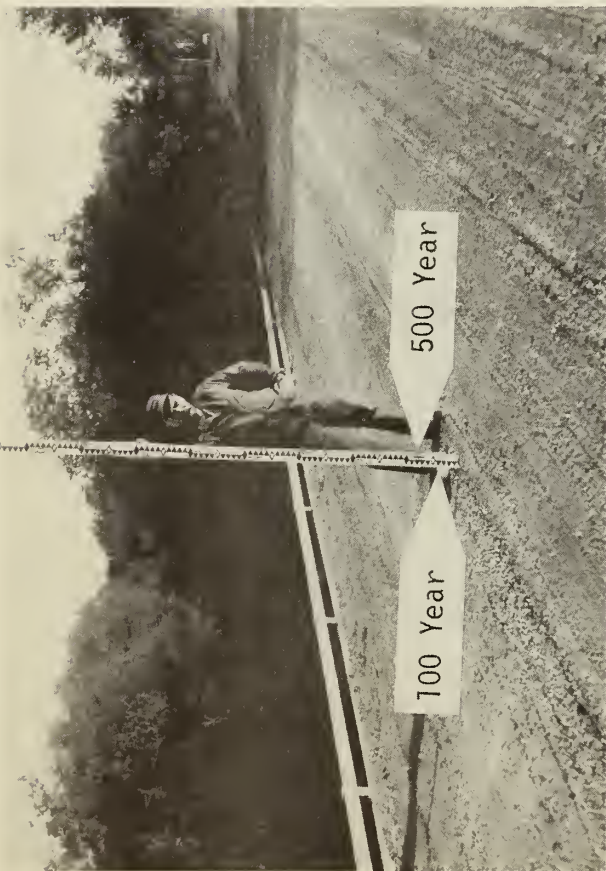
M-13.51 SECTIONS 1 & 2, T. 140 N., R. 51 W.

FIGURE 9



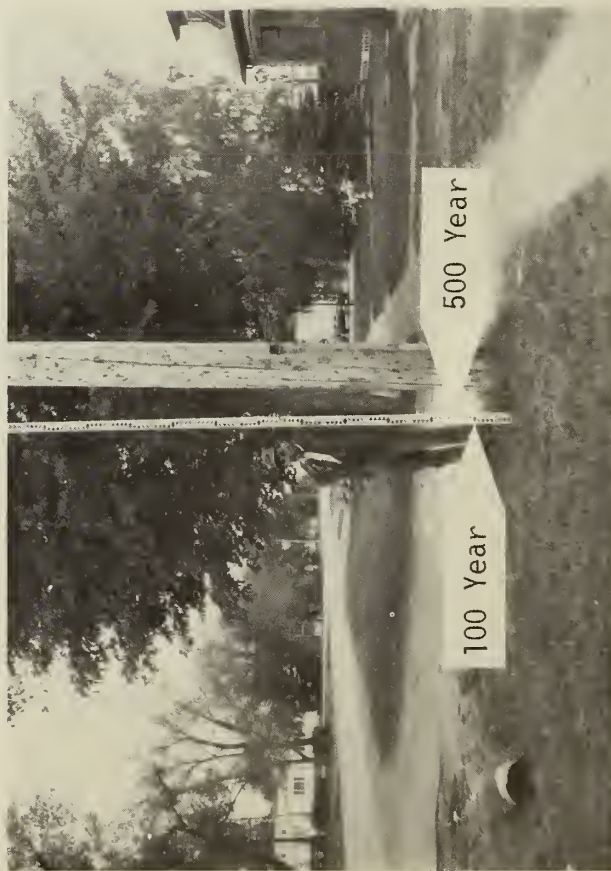
M-32.55 SECTION 5, T. 138 N., R. 51 W.  
EDGE OF DURBIN, NORTH DAKOTA

FIGURE 10



M-2.80 SECTIONS 24 & 23, T. 140 N., R. 50 W.

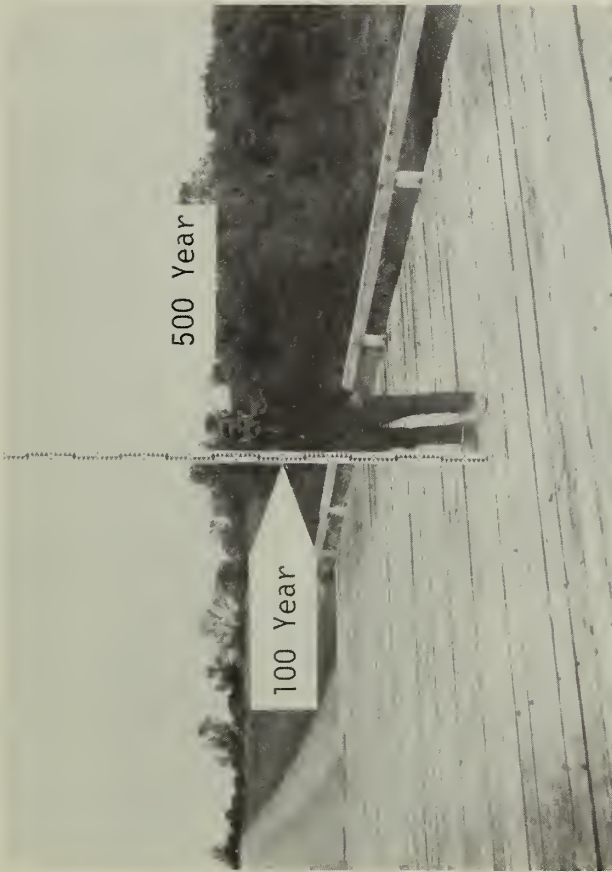
FIGURE 11



APPROX. M-13.55 SECTION 1, T. 140 N., R. 51 W.  
CITY OF MAPLETON, NORTH DAKOTA

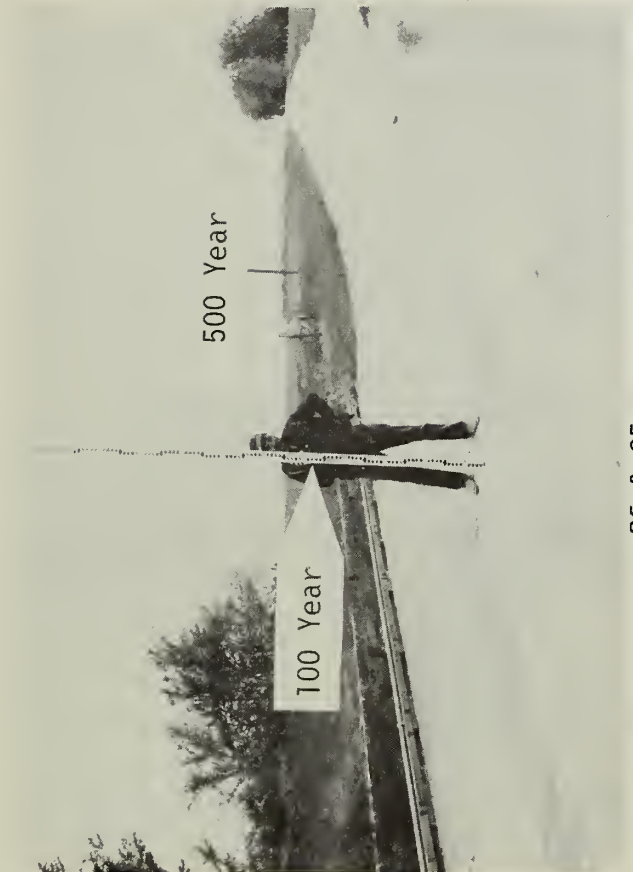
# MAPLE RIVER

FIGURE 12



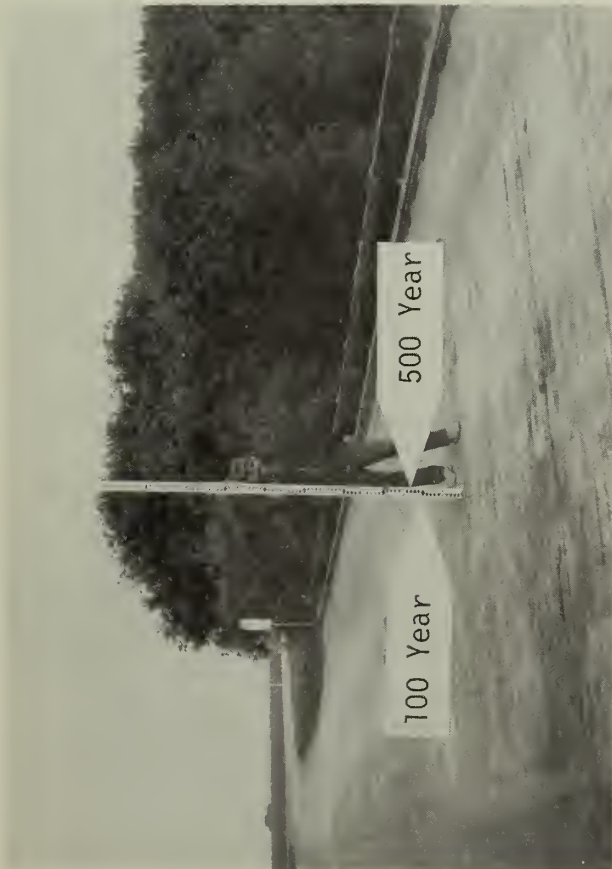
M-38.09 SECTIONS 24 & 13, T. 138 N., R. 52 W.

FIGURE 13



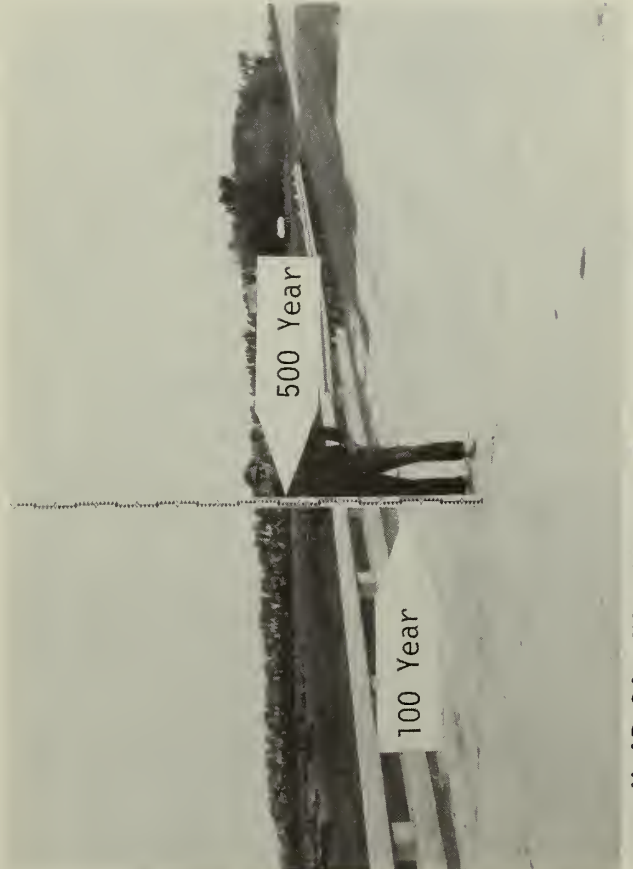
M-63.45 SECTIONS  $\frac{36 \text{ \& } 35}{25 \text{ \& } 26}$  T. 138 N. R. 53 W.

FIGURE 14



M-32.56 SECTIONS 32 & 5,  $\frac{T. 139 N.}{T. 138 N.}$  R. 51 W.

FIGURE 15

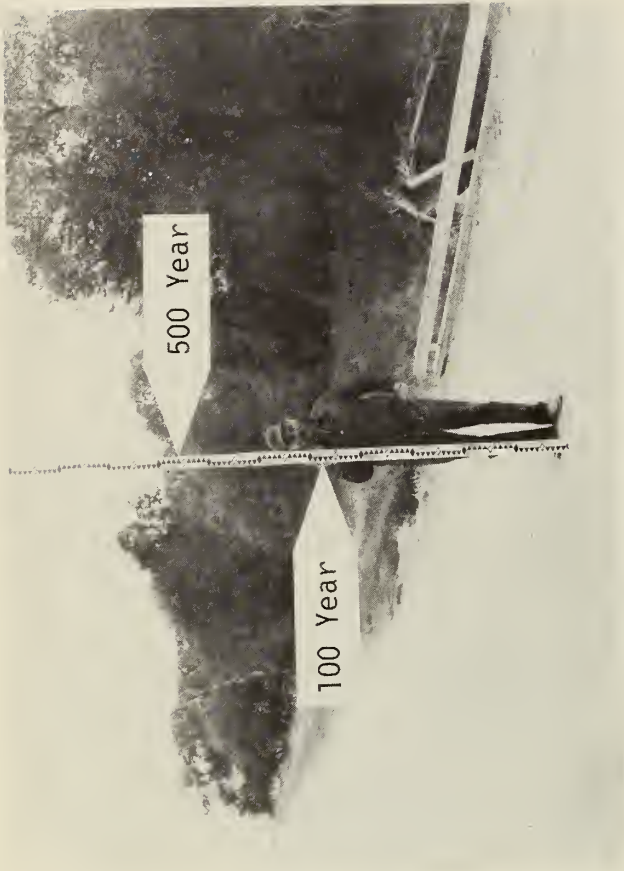


M-45.84 SECTIONS 23 & 22, T. 138 N., R. 52 W.



# MAPLE RIVER

FIGURE 16



M-80.90 SECTIONS 7 & 18, T. 137 N., R. 53 W.

FIGURE 17



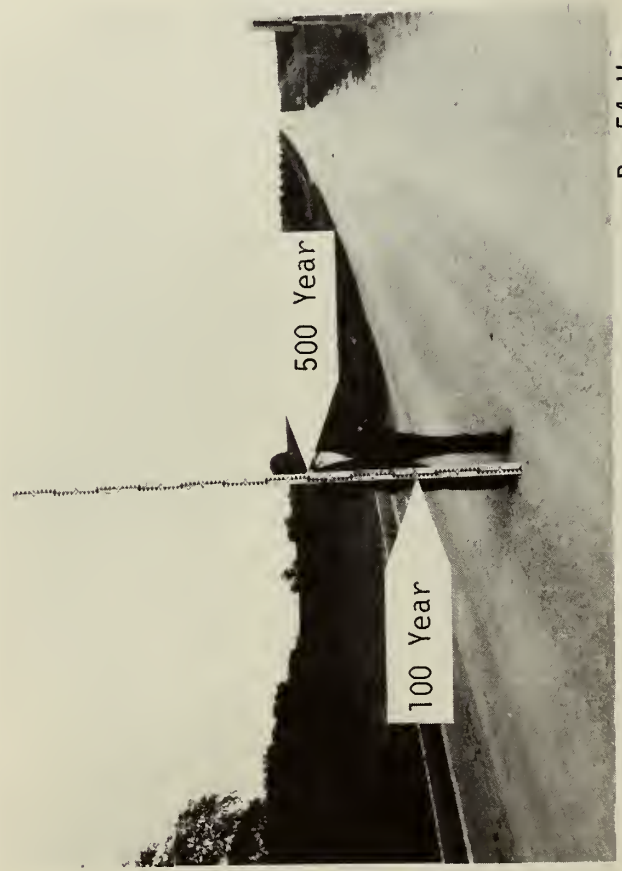
M-87.43 SECTIONS 11 & 14, T. 137 N., R. 54 W.

FIGURE 18



M-69.65 SECTIONS 34 & 35, T. 138 N., R. 53 W.

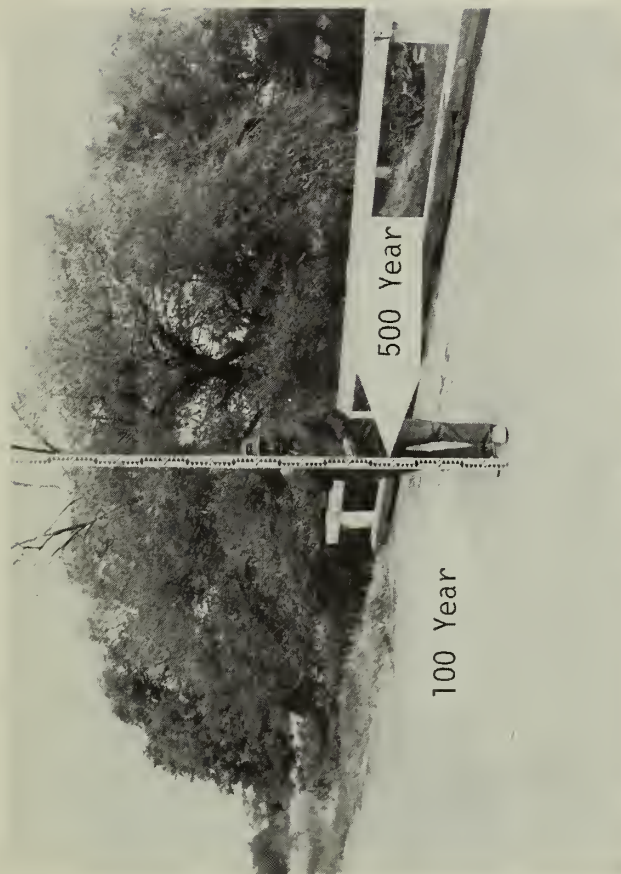
FIGURE 19



M-84.13 SECTIONS 13 & 18, T. 137 N., R. 54 W.  
R. 53 W.

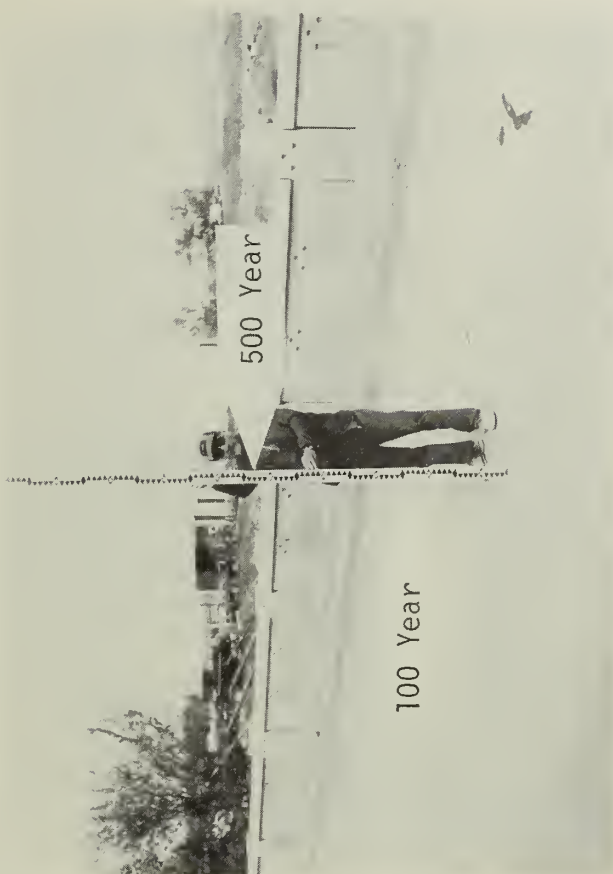
# MAPLE RIVER

FIGURE 20



M-96.18 SECTIONS 29 & 32, T. 137 N., R. 54 W.

FIGURE 21



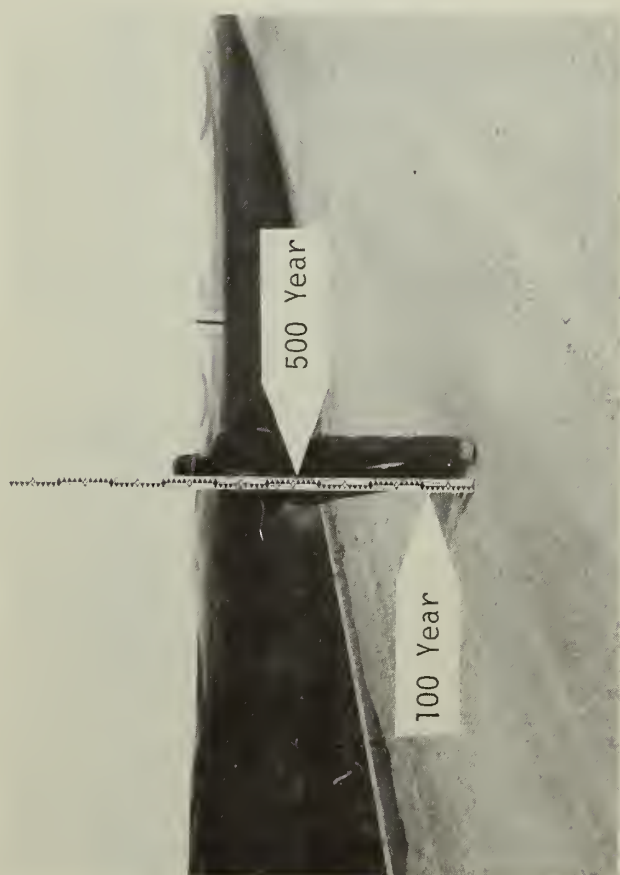
M-107.36 SECTIONS 4 & 34, T. 136 N., R. 55 W.

FIGURE 22



M-93.84 SECTIONS 21 & 28, T. 137 N., R. 54 W.

FIGURE 23

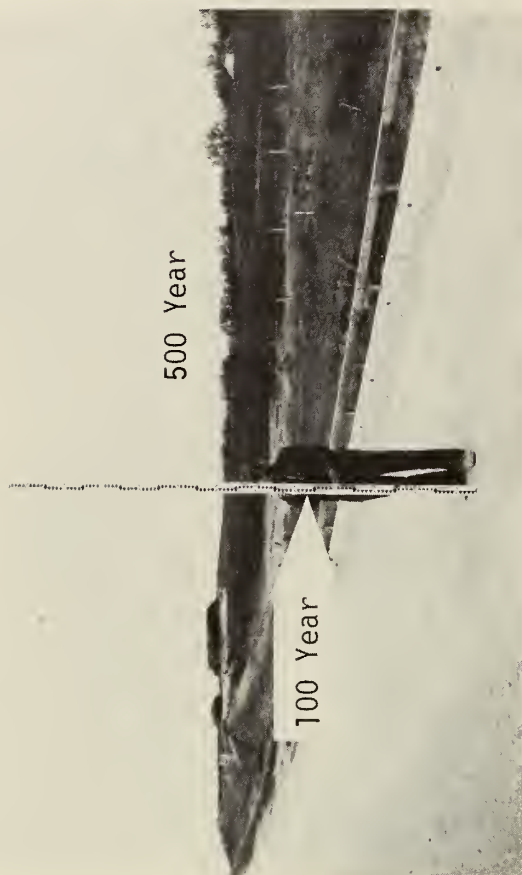


M-105.06 SECTIONS 2 & 3, T. 136 N., R. 55 W.



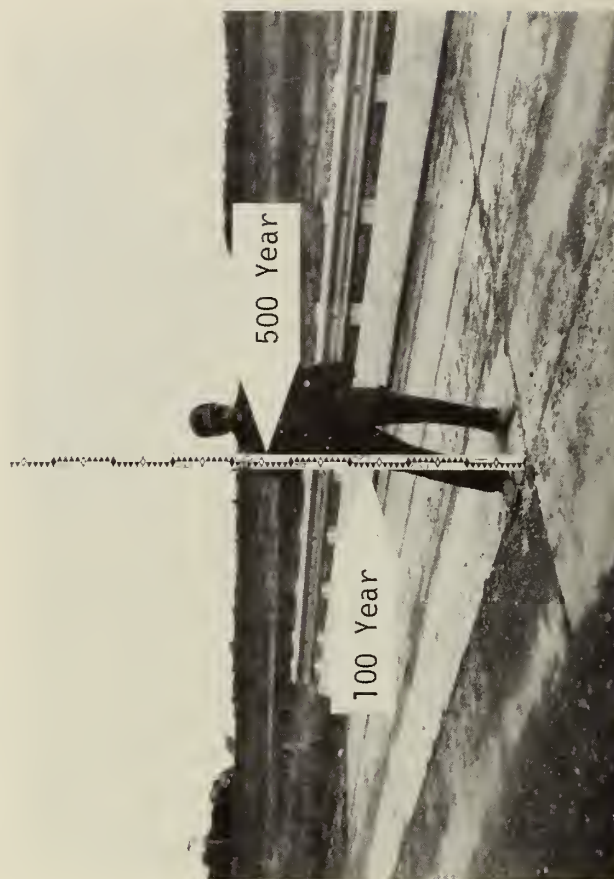
# MAPLE RIVER

FIGURE 24



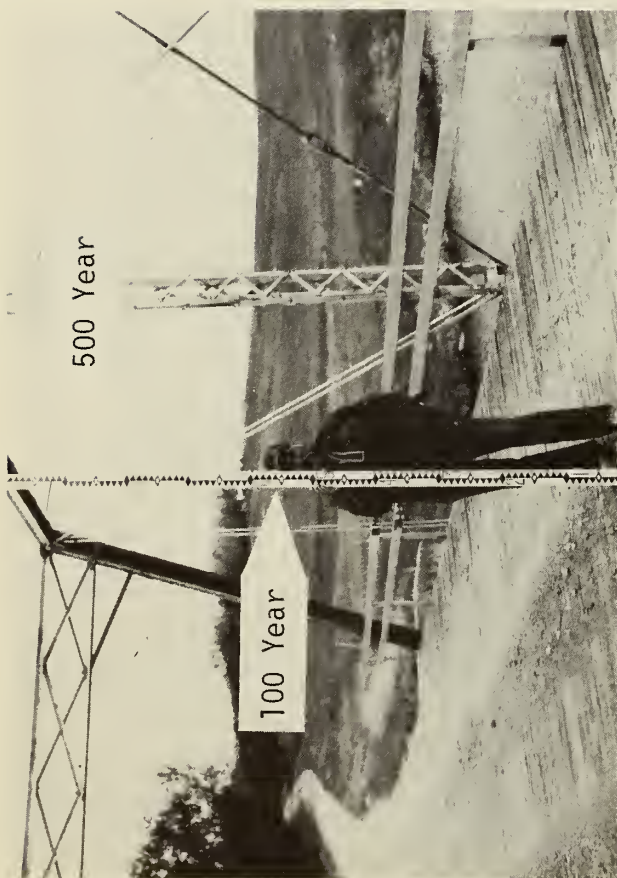
M-114.37 SECTIONS 9 & 4, T. 137 N., R. 55 W.

FIGURE 25



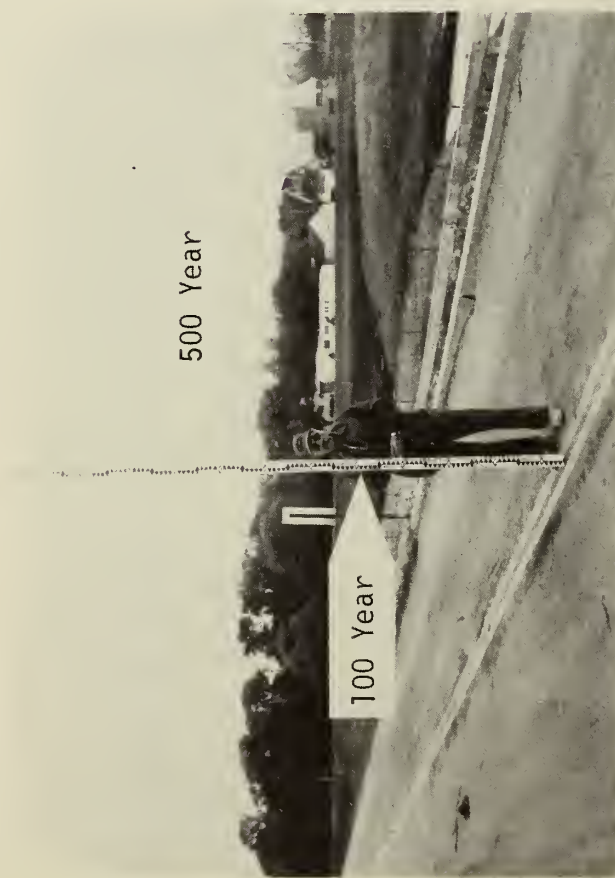
M-127.44 SECTIONS 3 & 4, T. 138 N., R. 55 W.

FIGURE 26



M-110.58 SECTIONS 28 & 21, T. 137 N., R. 55 W.

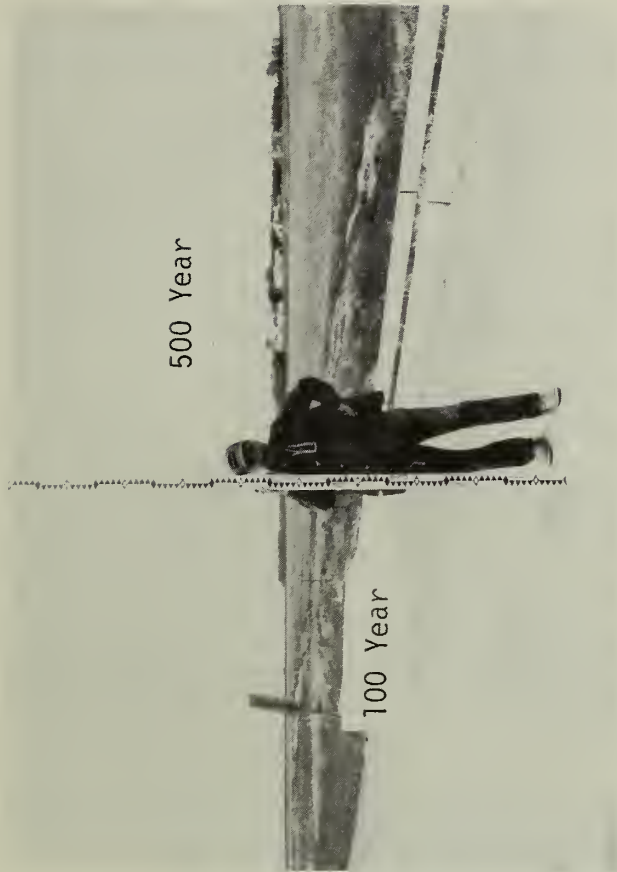
FIGURE 27



M-120.87 SECTIONS 22 & 15, T. 138 N., R. 55 W.

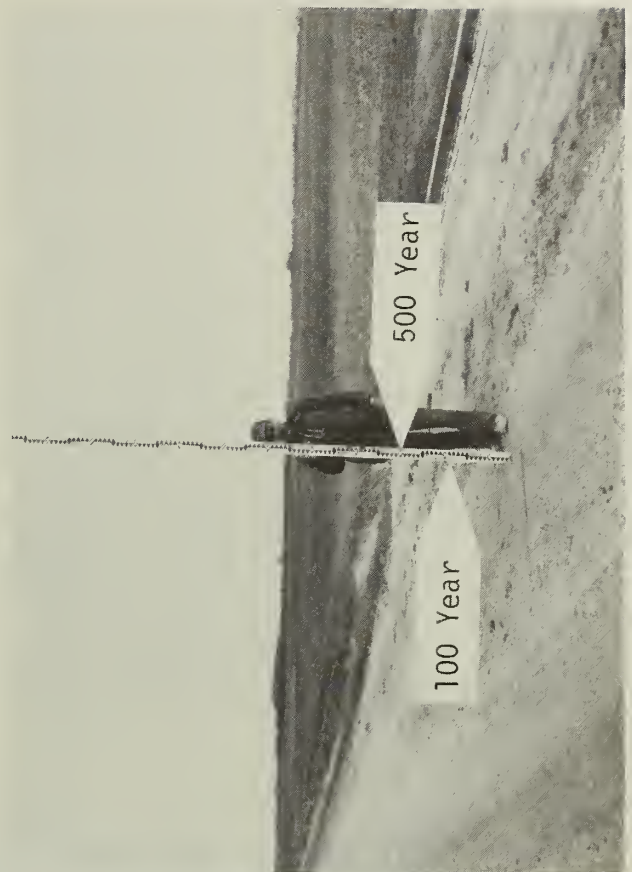
# MAPLE RIVER

FIGURE 28



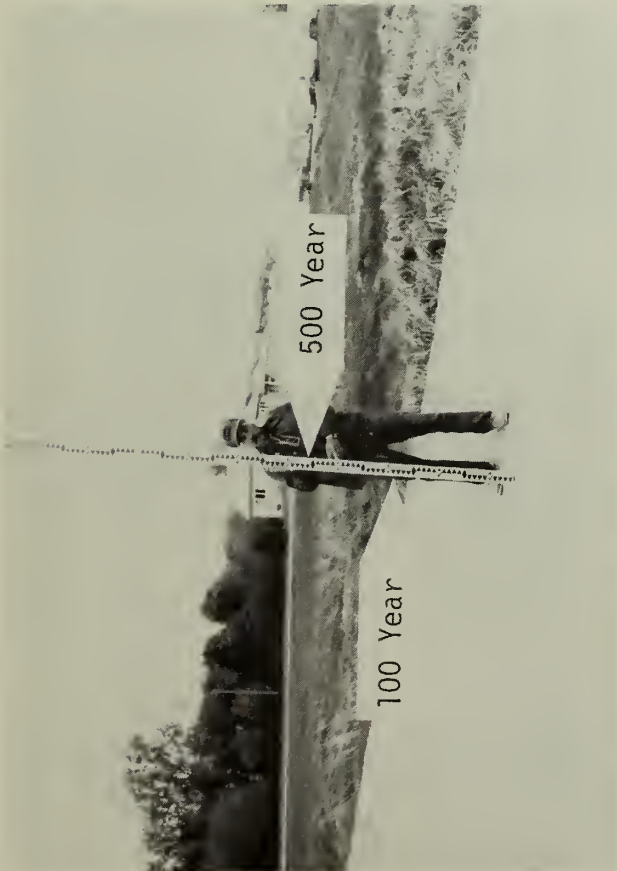
M-150.11 SECTIONS 3, T. 140 N.  
35, T. 141 N. R. 55 W.

FIGURE 29



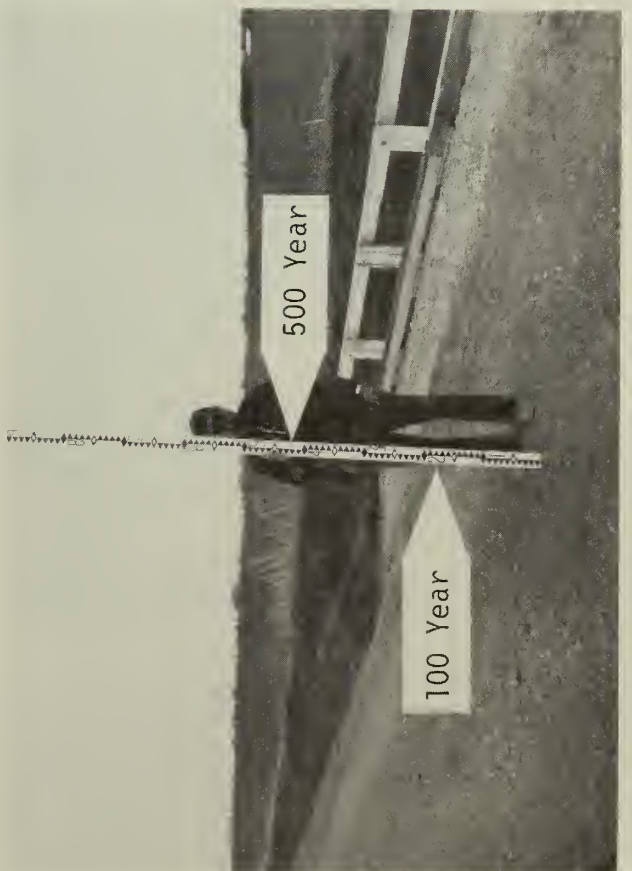
M-159.14 SECTIONS 33 & 28, T. 142 N., R. 55 W.

FIGURE 30



M-143.01 SECTIONS 27 & 22, R. 138 N., R. 55 W.

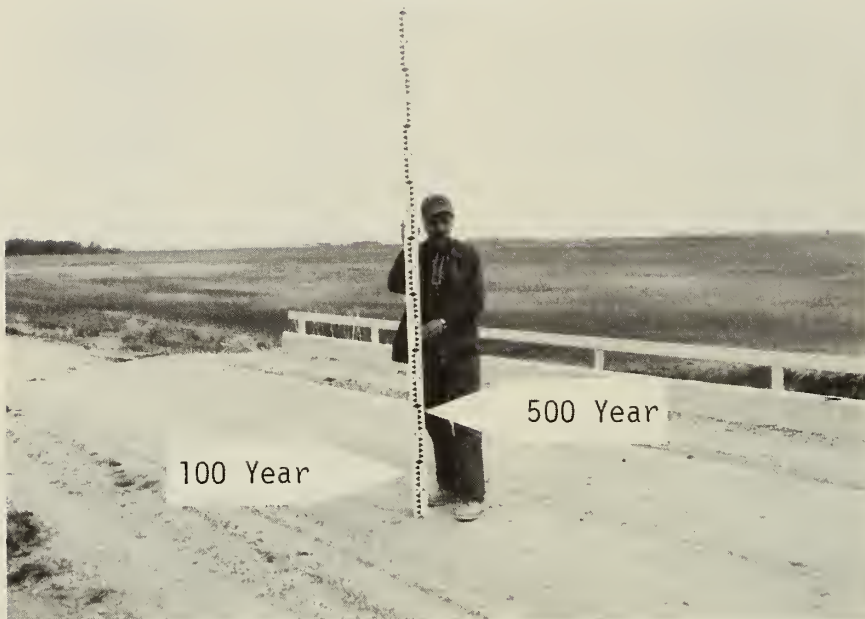
FIGURE 31



M-154.57 SECTIONS 22 & 15, T. 141 N., R. 55 W.

MAPLE RIVER

FIGURE 32



M-162.31 SECTIONS 16 & 19, T. 142 N., R. 55 W.



A planning procedure such as this is a vital part of the comprehensive flood plain management program. Effective flood plain management involves the full range of public policy and action needed for the wise use and development of the flood plain. It includes a range of measures from collection and dissemination of flood control information to acquisition of flood plain lands, construction of control structures, and enactment of ordinances and statutes regarding flood plain land use and development.

A sound local flood plain management program is comprised of numerous elements. Some of these are: structural flood control works to protect existing development; regulations to guide new development; flood insurance to protect existing and new buildings and individual protection measures, such as flood proofing.

#### Flood Control Measures

Various flood control measures, including enlarged bridge openings, levees, floodways and channel work, or a combination of these, could be installed to reduce the area flooded.

#### Flood Plain Regulations

Flood plain regulations are designed to permit realistic use of flood plain areas without materially increasing the flood damage potential. Among the various elements used to accomplish this are zoning ordinances, subdivision regulation, building codes and sanitary and utility regulations. For a guide, see "A Perspective on Flood Plain Regulations for Flood Plain Management," Corps of Engineers Manual EP 1165-2-3-4, 1 June 1976.

#### Flood Insurance

Under the National Flood Insurance Act of 1968 (P.L. 90-448), the Federal Emergency Management Agency (FEMA), Division of Federal Insurance

and Mitigation (DFIM), is authorized to carry out a National Flood Insurance Program (NFIP), which makes flood insurance coverage available to all walled and roofed structures used for residential, business, religious and agricultural purposes, buildings occupied by nonprofit organization, and those owned by state or local governments or their agencies. Coverage is also available for the contents. The cities of Enderlin and Mapleton are participating in the FIM's Emergency Program. In those communities participating in the FIM's program, owners and occupiers of all buildings and mobile homes in the entire community are eligible to obtain flood insurance coverage; and it is recommended that buildings and mobile homes within or adjacent to the delineated flood hazard areas carry flood insurance on the structure and contents.

Further inquiries about the flood insurance program should be directed to the North Dakota State Water Commission, the official state coordinating agency for flood insurance.

#### Other Measures

Land use and other regulatory controls, including zoning, subdivision regulation and building codes, play an important role in flood plain management. However, in order for these measures to be effective, it is important that the community take action to implement other programs and measures to supplement these controls. A few possible measures are: (1) open space land acquisition programs, (2) urban renewal programs, (3) preferential tax assessment, (4) flood proofing of existing structures and (5) public policy governing the construction of utilities and public facilities such as bridges and streets in a manner to control development in flood prone areas.



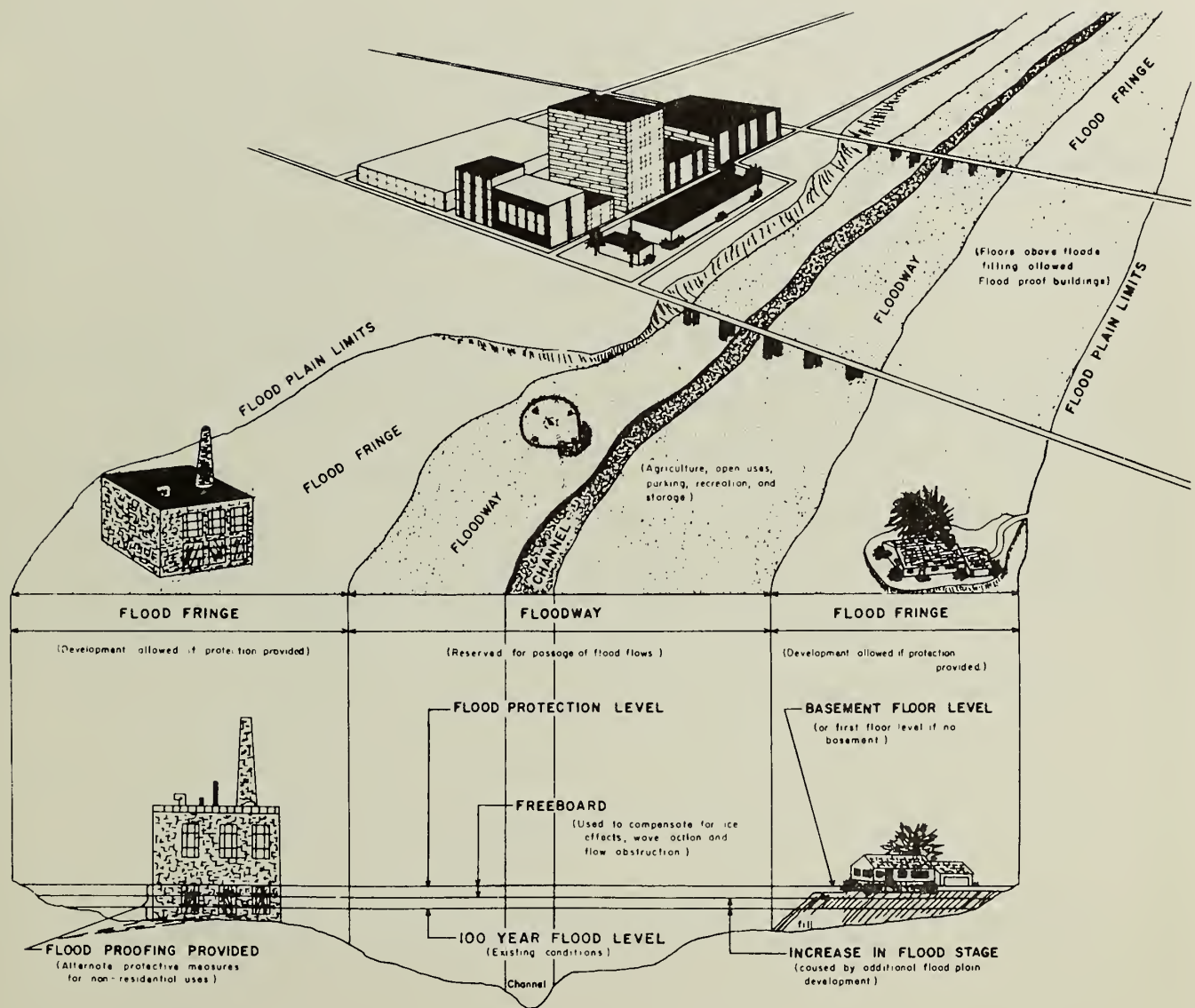


FIGURE 33. Perspective and cross sectional view of the structure of a typical regulatory flood plain.



The North Dakota State Water Commission, upon request, will provide assistance in flood proofing techniques, the implementation of a flood warning system, and establishment of a local flood data collection program.

### Recommendations

Some specific recommendations for alleviating the flood situation along the flood plain of the Maple River are:

1. Adoption of local land use and zoning regulations for all flood plain areas.

2. Installation of a levee system to protect extensively developed flood plain areas (especially residential and public buildings).

3. Flood proofing existing or future buildings that otherwise cannot be adequately protected. (See U.S. Army Corps of Engineers "Manual of Flood Proofing Regulations," EP 11652314 and "Elevated Residential Structures Reducing Flood Damage Through Building Design: A Guide Manual, " published by the Federal Insurance and Hazard Mitigation Division (HUD).

4. Using as much of the flood hazard area as possible for city and county parks and other open space uses.

5. Increase the areas of bridge and culvert openings to minimize head losses during passage of large floods.

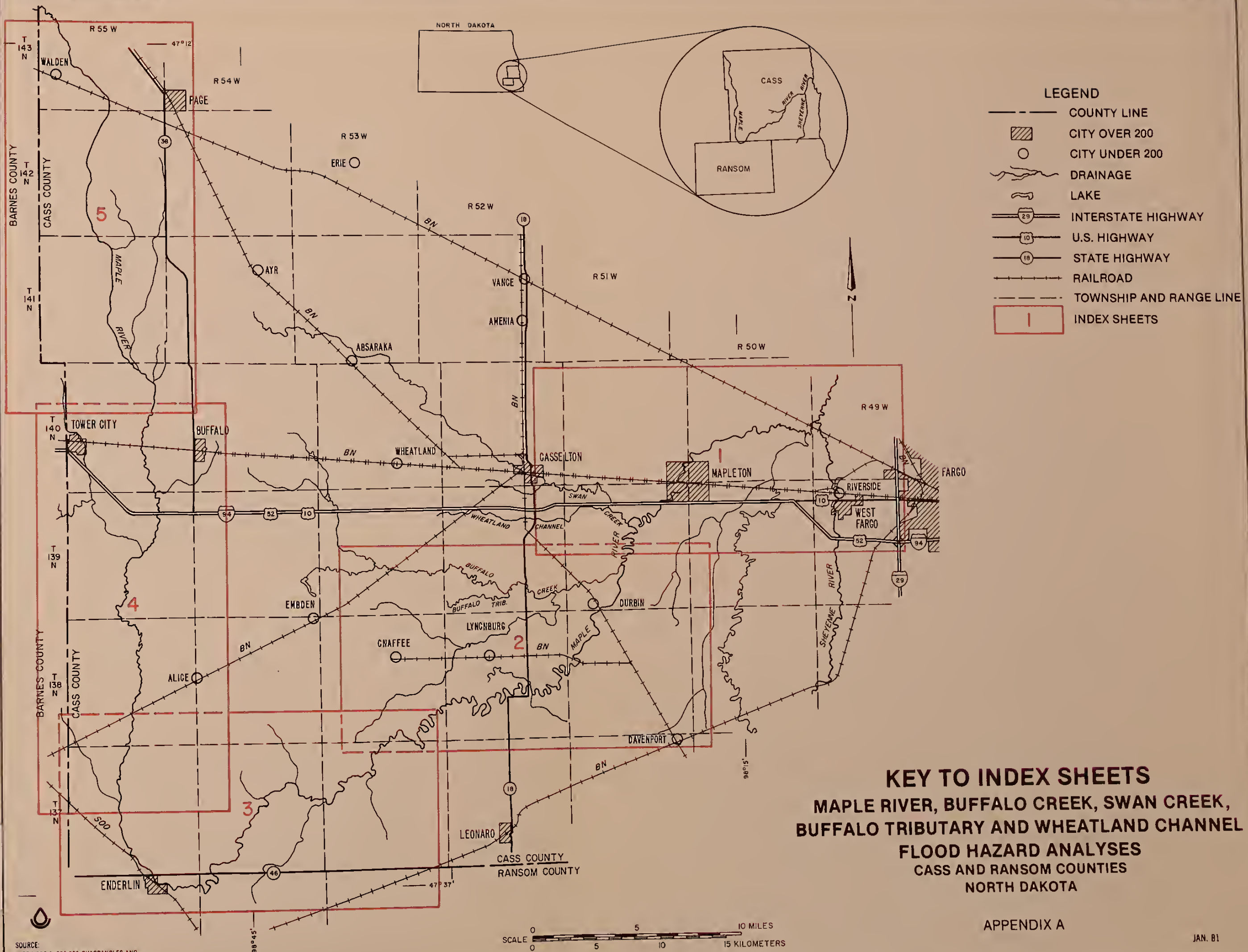
6. Installation of flood control structures in the upper reaches of the Watershed.

7. Channel improvement.

The basic purpose of flood plain regulations is to regulate development on the flood plain consistent with nature's needs for the conveyance of flood flows and the community's land use and development objectives, in order to reduce future flood losses.











1

100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)

DRAINAGE

CORPORATE LIMIT

94

INTERSTATE HIGHWAY

10

U.S. HIGHWAY

STUDY LIMIT

TOWNSHIP AND RANGE LINE

**LEGEND**

SHEET COVERAGE

100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)

DRAINAGE

CORPORATE LIMIT

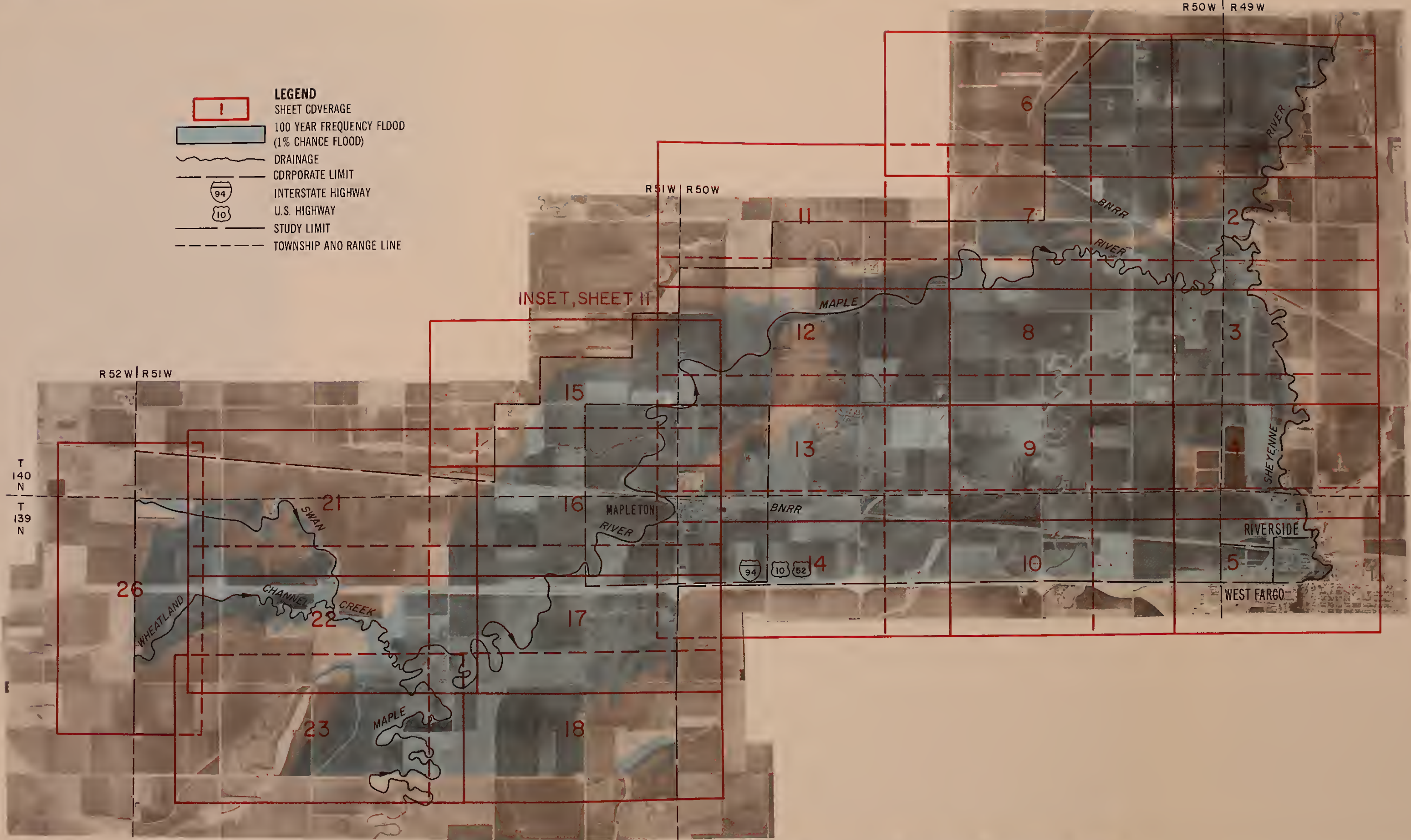
INTERSTATE HIGHWAY

U.S. HIGHWAY

STUDY LIMIT

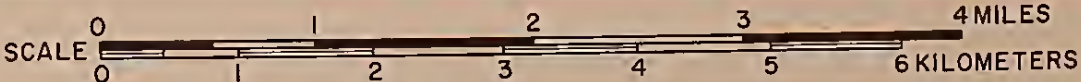
TOWNSHIP AND RANGE LINE

INSET, SHEET II



**INDEX TO SHEETS**  
**MAPLE RIVER**  
**FLOOD HAZARD ANALYSES**  
**MAPLE RIVER, SWAN CREEK AND**  
**WHEATLAND CHANNEL**  
**CASS COUNTY, NORTH DAKOTA**  
**INDEX SHEET 1 OF 5**

APPENDIX A



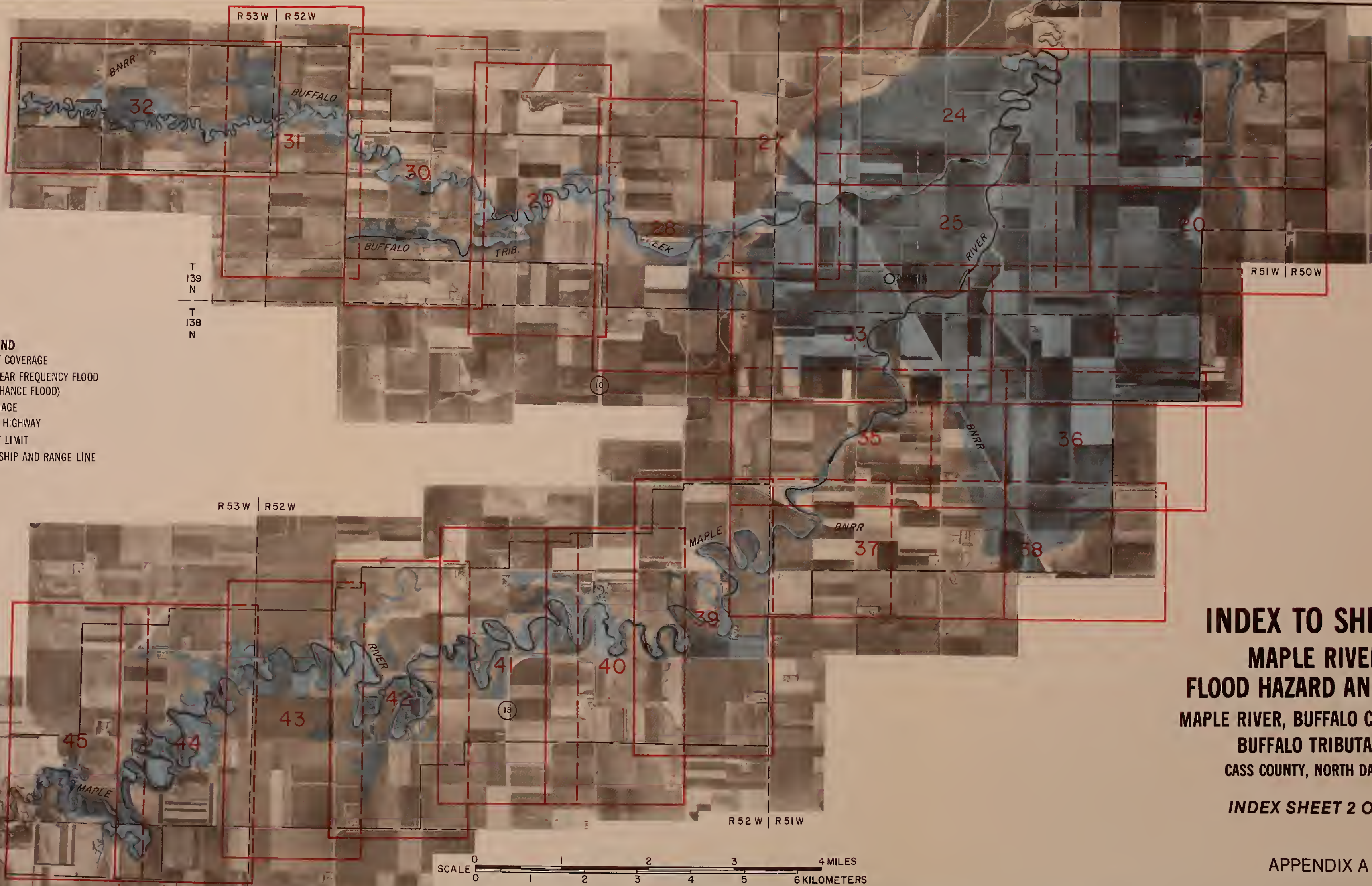
SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D., HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL  
USDA-SCS-LINCOLN, NEBR. 1981







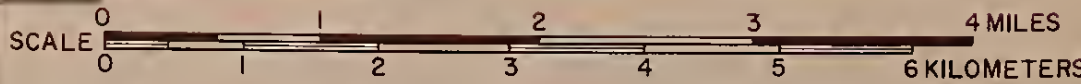
- LEGEND**
- 45 SHEET COVERAGE
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - DRAINAGE
  - 18 STATE HIGHWAY
  - STUDY LIMIT
  - TOWNSHIP AND RANGE LINE



**INDEX TO SHEETS**  
**MAPLE RIVER**  
**FLOOD HAZARD ANALYSES**  
**MAPLE RIVER, BUFFALO CREEK AND**  
**BUFFALO TRIBUTARY**  
**CASS COUNTY, NORTH DAKOTA**  
**INDEX SHEET 2 OF 5**

APPENDIX A

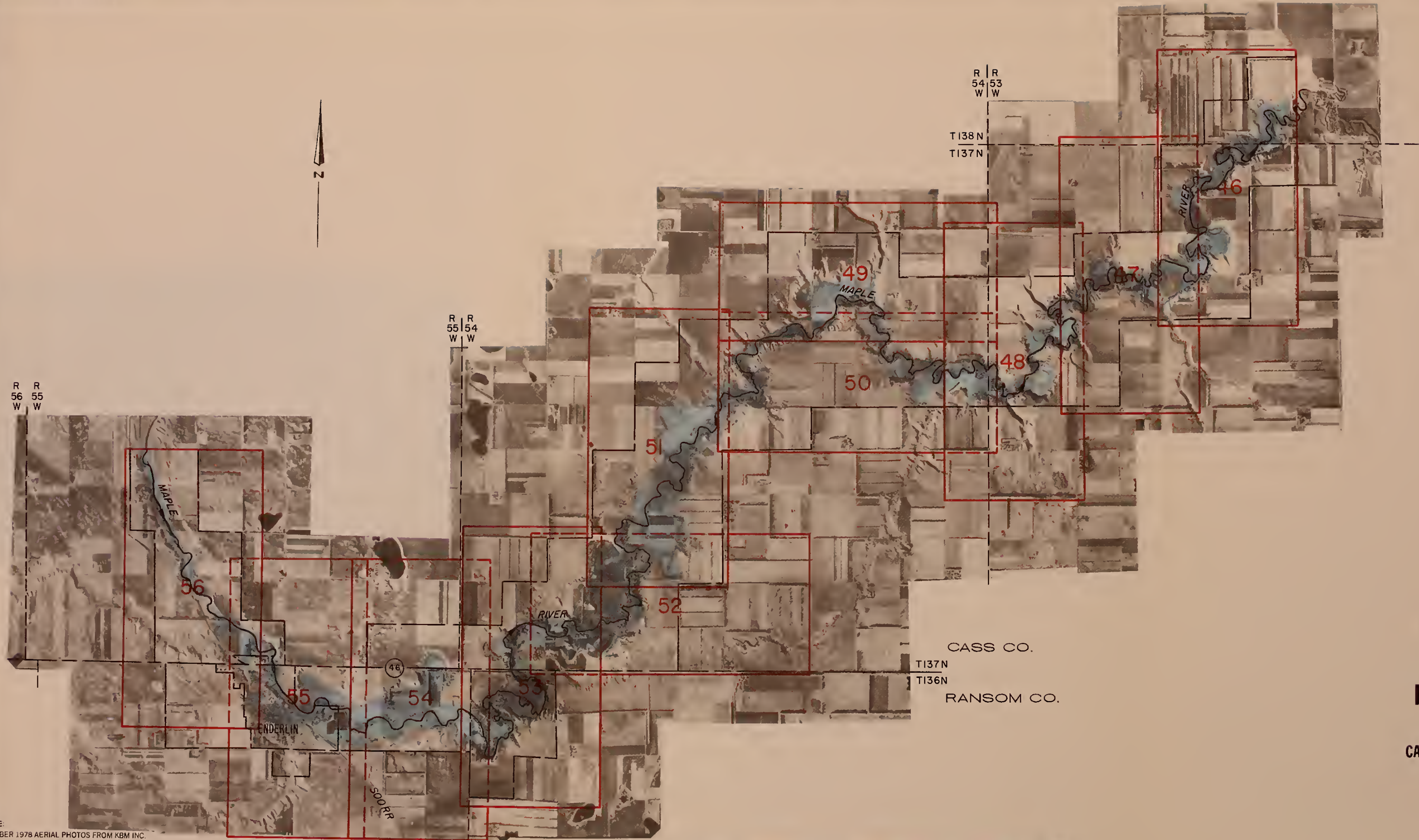
SOURCE:  
 NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
 GRAND FORKS, N. D., HORIZONS INC. RAPID CITY, S. D.  
 AND INFORMATION FROM SCS FIELD PERSONNEL  
 USOA-SCS LINCOLN, NEBR. 1981











- 56**
- LEGEND**
- SHEET COVERAGE
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLDDD)
  - DRAINAGE
  - CORPDRATE LIMIT
  - STATE HIGHWAY
  - STUDY LIMIT
  - TOWNSHIP AND RANGE LINE
  - COUNTY LINE

**INDEX TO SHEETS**  
**MAPLE RIVER**  
**FLOOD HAZARD ANALYSES**  
**MAPLE RIVER**  
**CASS AND RANSOM COUNTIES, NORTH DAKOTA**

**INDEX SHEET 3 OF 5**

**APPENDIX A**

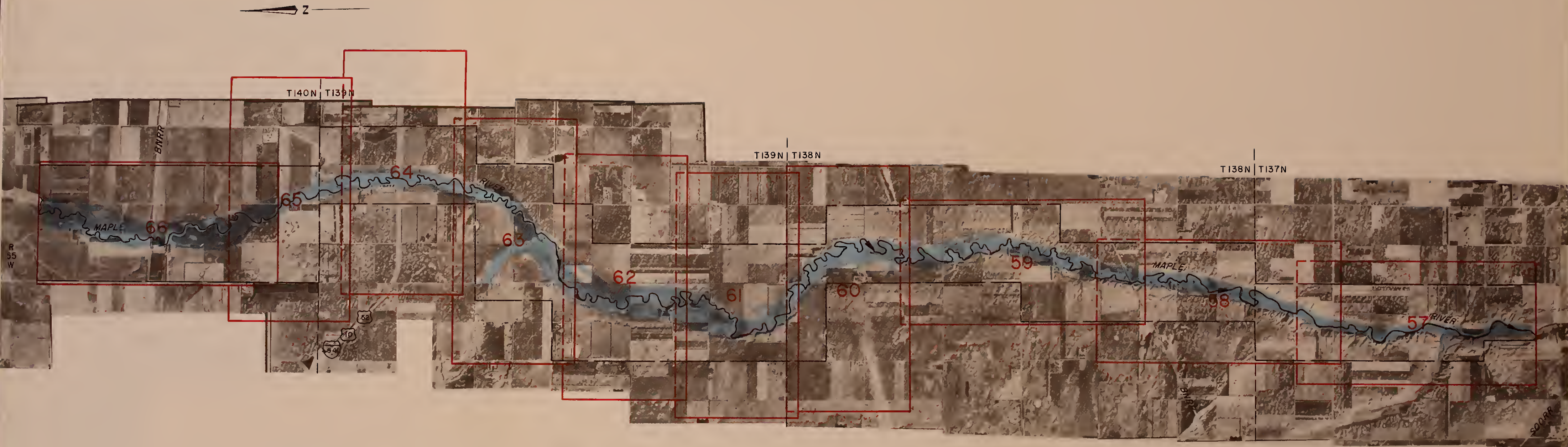
SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D., HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL  
USDA SCS-LINCOLN, NEBR. 1981











- LEGEND**
- 66** SHEET COVERAGE
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - DRAINAGE
  - INTERSTATE HIGHWAY
  - U.S. HIGHWAY
  - STUDY LIMIT
  - TOWNSHIP AND RANGE LINE

**INDEX TO SHEETS**  
**MAPLE RIVER**  
**FLOOD HAZARD ANALYSES**  
**MAPLE RIVER**  
**CASS COUNTY, NORTH DAKOTA**  
**INDEX SHEET 4 OF 5**

APPENDIX A

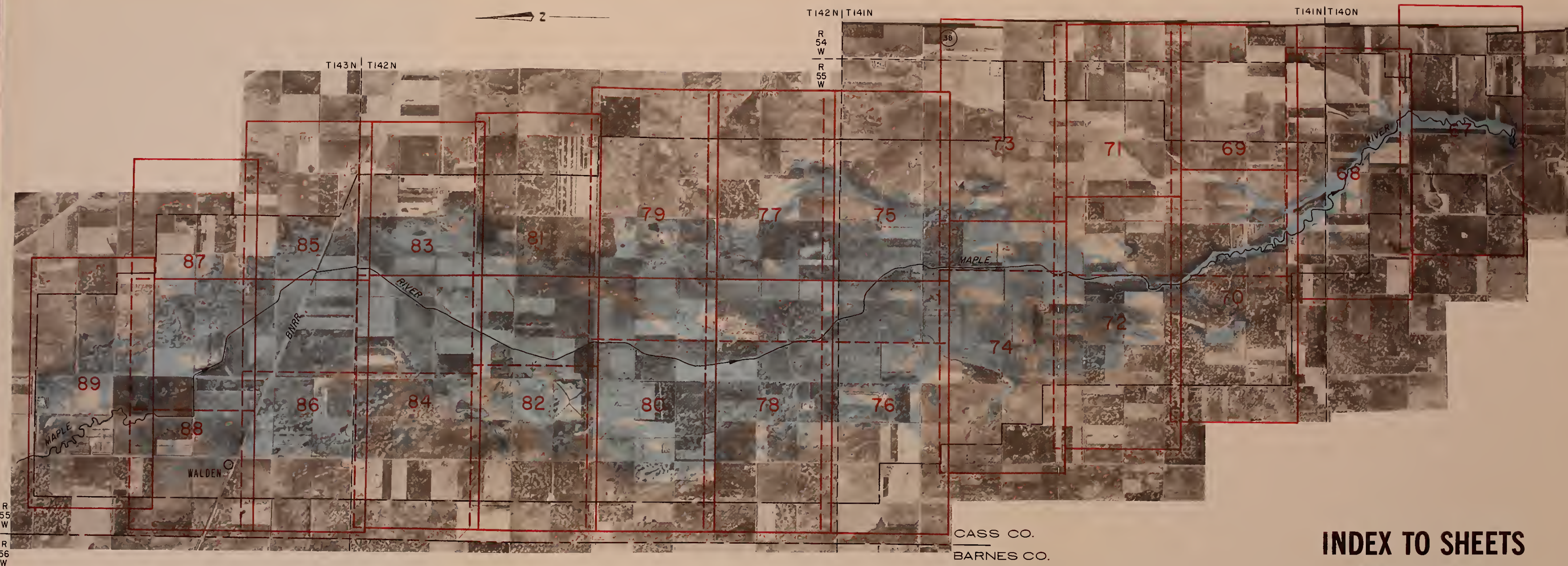
SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D., HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL  
USDA SCS LINCOLN, NEBR. 1981





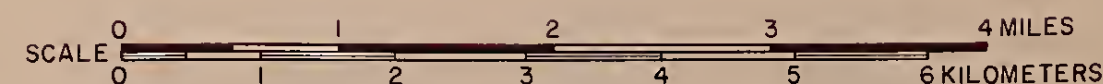






# **INDEX TO SHEETS** **MAPLE RIVER** **FLOOD HAZARD ANALYSES** **MAPLE RIVER** **CASS COUNTY, NORTH DAKOTA** **INDEX SHEET 5 OF 5**

- LEGEND**
- 89 SHEET COVERAGE
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - DRAINAGE
  - 38 STATE HIGHWAY
  - STUDY LIMIT
  - TOWNSHIP AND RANGE LINE
  - COUNTY LINE



APPENDIX A





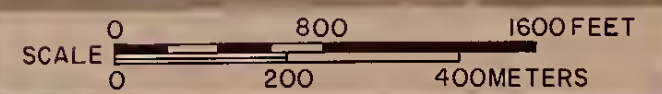




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 1 OF 69  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC, RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

USDA SCS-LINCOLN, NEBR. 1981







**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

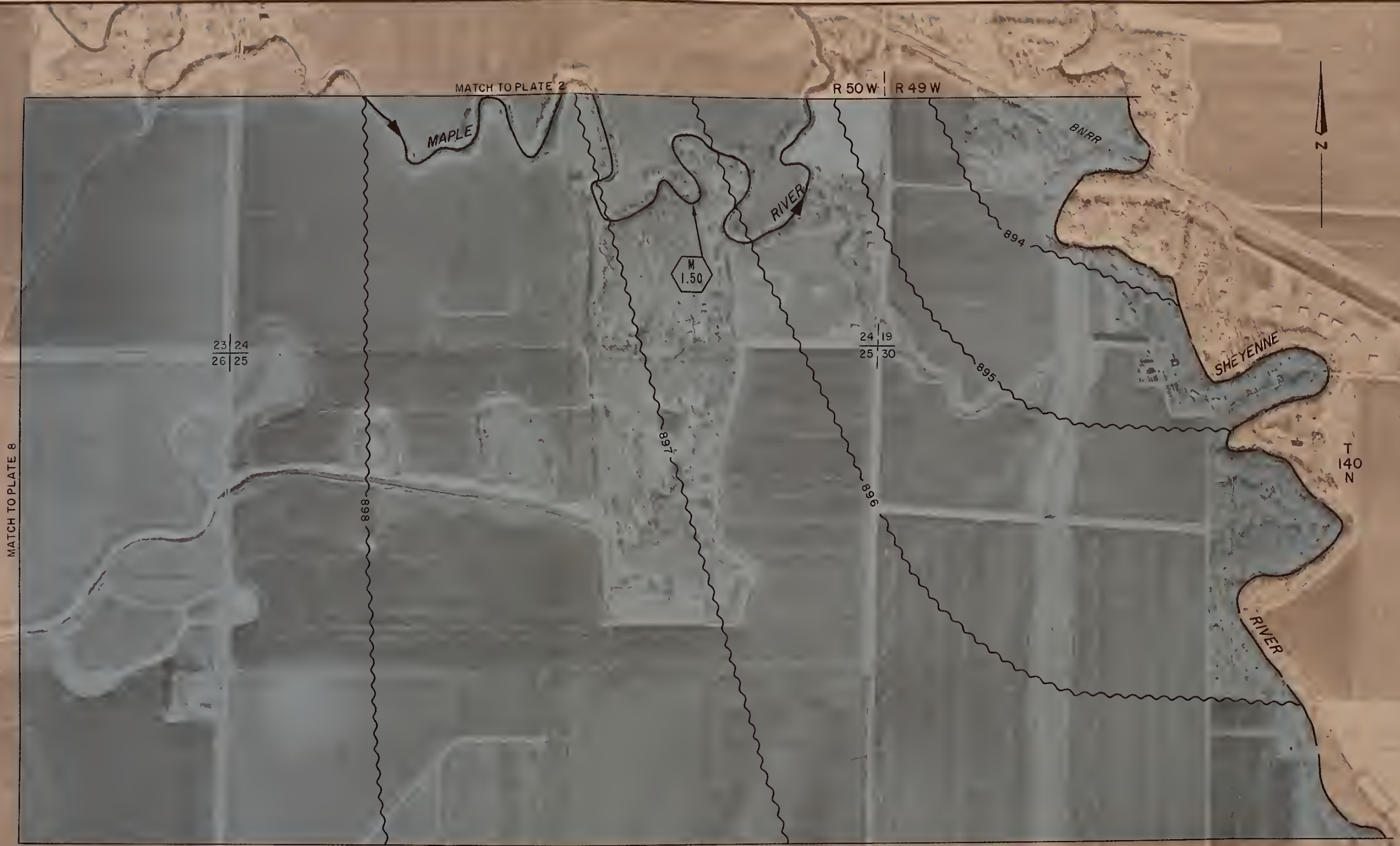
PLATE 2 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





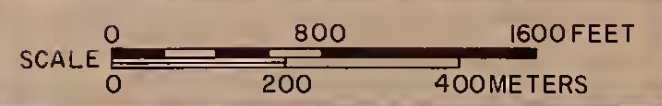




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK X RM B3

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





MATCH TO PLATE 9

MATCH TO PLATE 3

R 50 W | R 49 W

26 | 25  
35 | 36

25 | 30  
36 | 31

897

898

898

T  
140  
N

899

SEWAGE  
LAGOONS

SEWAGE  
LAGOONS

MATCH TO PLATE 5

RIVER

SHEYENNE

2

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- RM 83 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 4 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

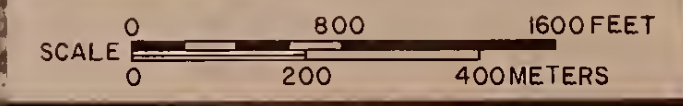




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

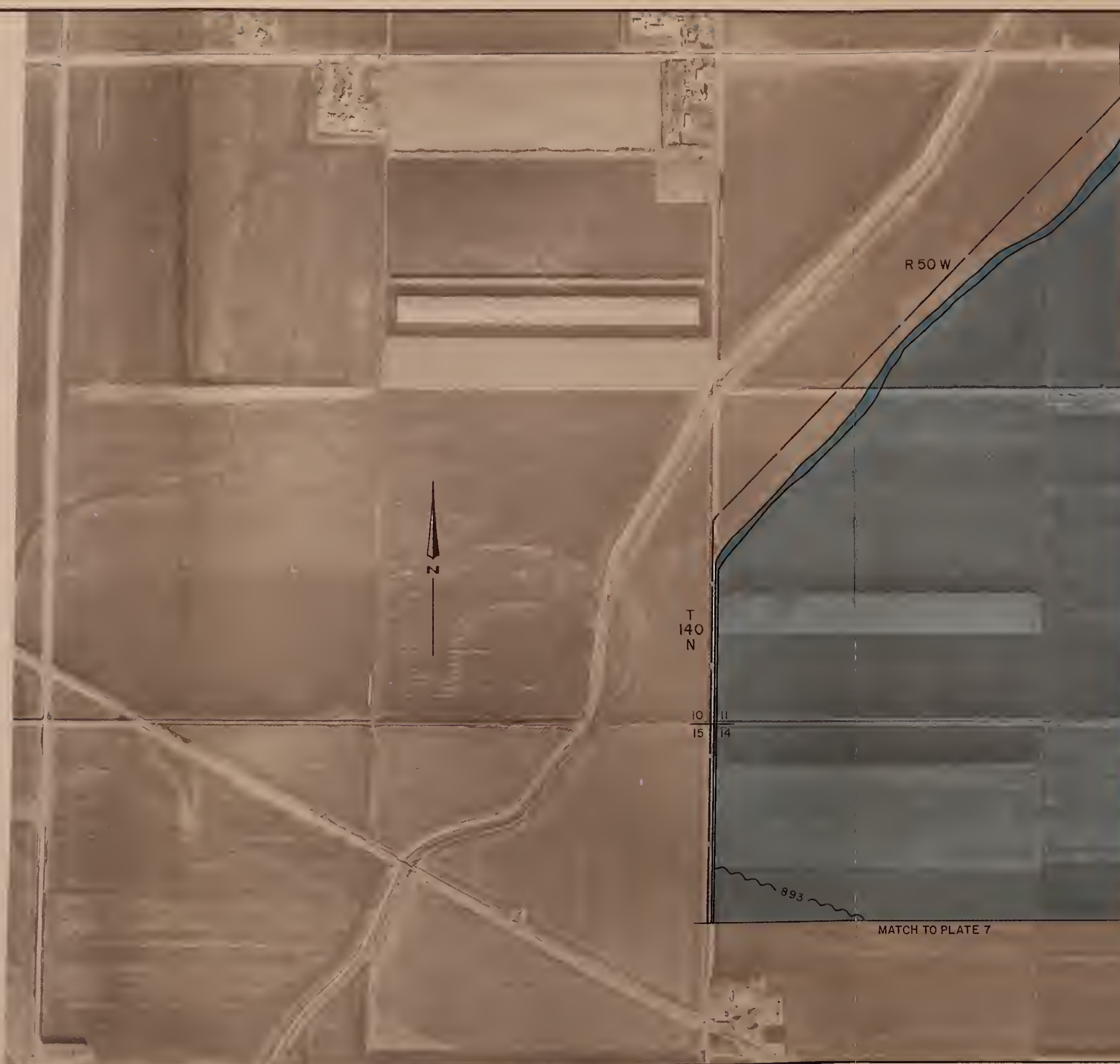
PLATE 5 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC., RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





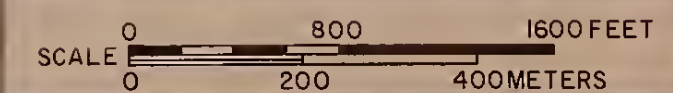
SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- X RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 6 OF 89  
APPENDIX A







NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS, INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





MATCH TO PLATE 11

MATCH TO PLATE 7

R 50 W

RIVER

MAPLE

RM-F

X

21 22  
28 27

22 23  
27 26

901

900

899

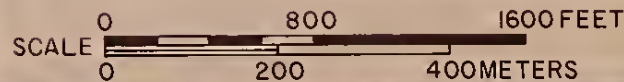
MATCH TO PLATE 3

T  
140  
N

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- RM 83 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 8 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.,  
GRAND FORKS, N.D. HORIZONS INC., RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





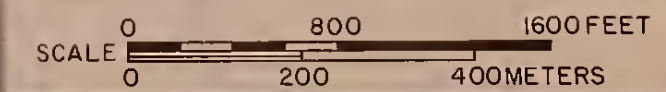
R 50 W  
MATCH TO PLATE 8



**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 9 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1976 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



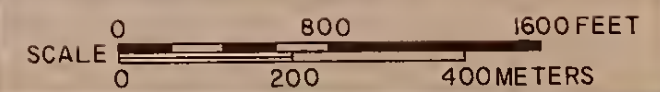




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- X RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 10 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

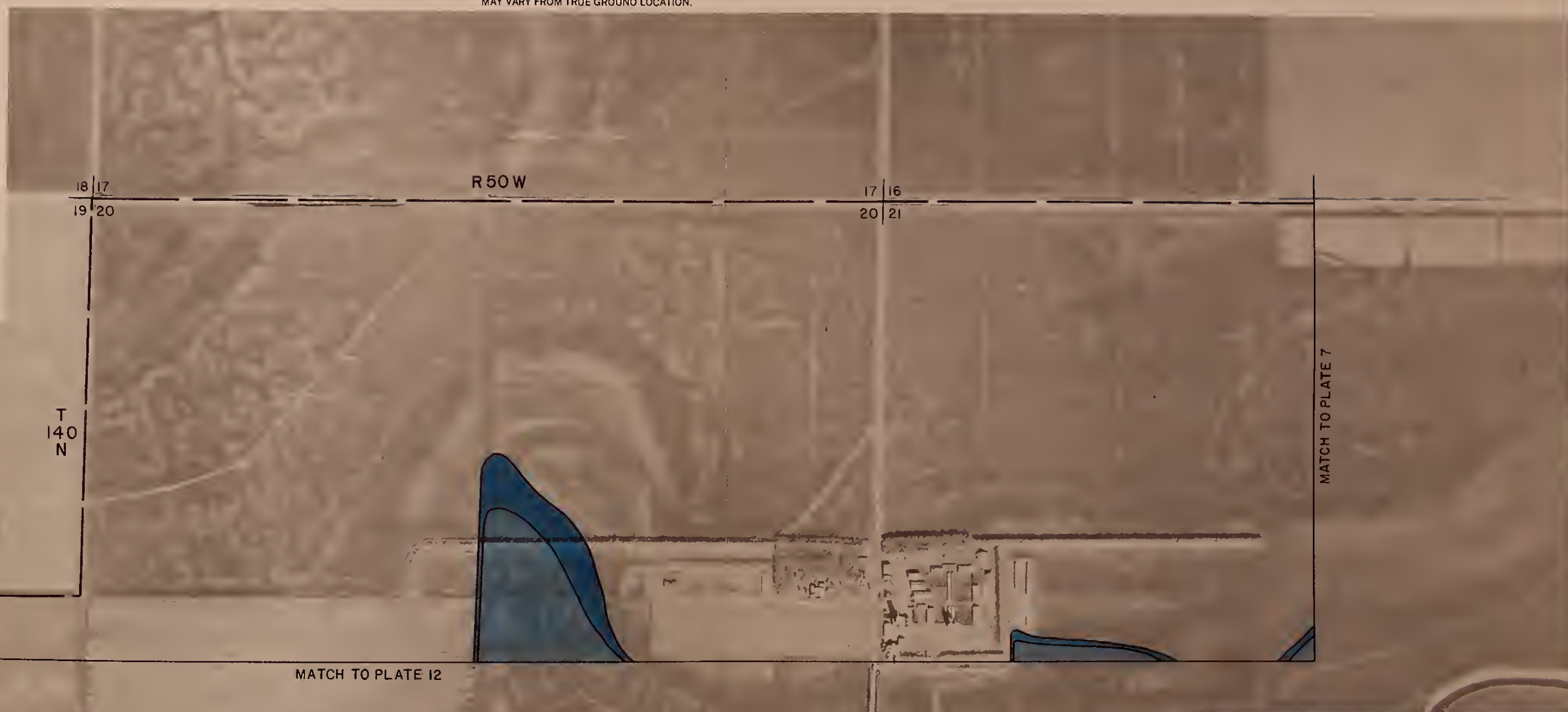
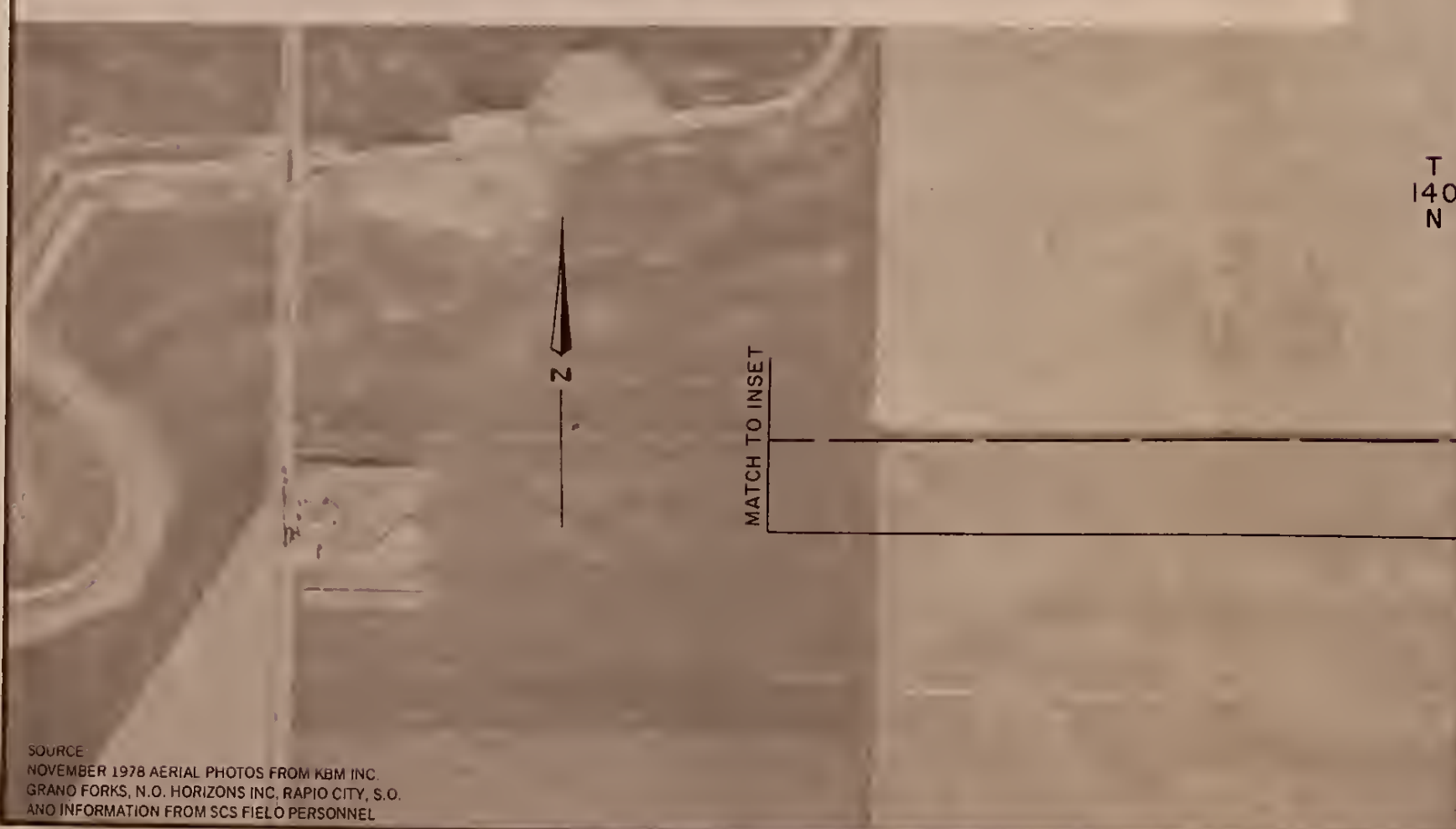




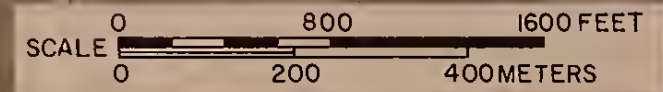


- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

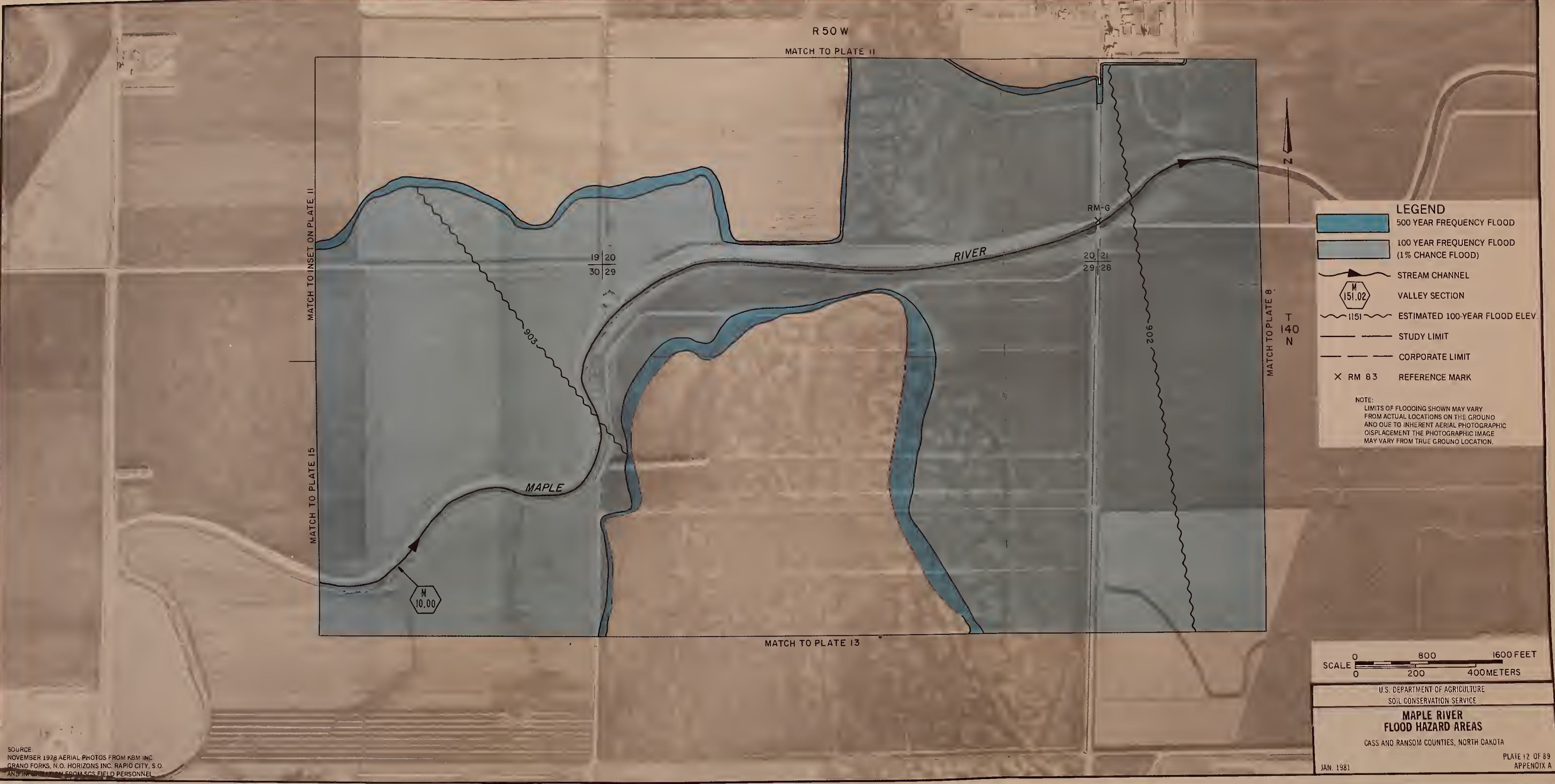
CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 11 OF 89  
APPENDIX A







R 50 W  
MATCH TO PLATE 11

MATCH TO INSET ON PLATE 11

MATCH TO PLATE 15

MATCH TO PLATE 8

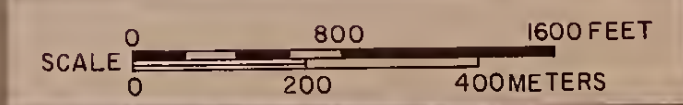
N

T 140 N

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK X RM 83

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 12 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



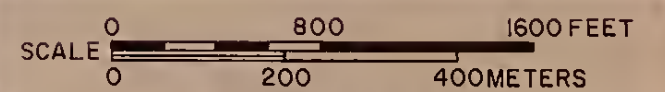




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 13 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KENT  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SO FIELD PERSONNEL





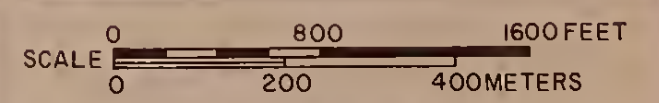




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - X RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

27 26  
34 35

T  
140  
N

26 25  
35 36

MAPLETON

MATCH TO PLATE 16

R 51W | R 50W  
MATCH TO INSET ON PLATE 11

RIVER

MATCH TO PLATE 13

MATCH TO PLATE 13

MATCH TO PLATE 12

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 15 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







R 51 W  
MATCH TO PLATE 15

T 140 N  
T 139 N

MATCH TO PLATE 21

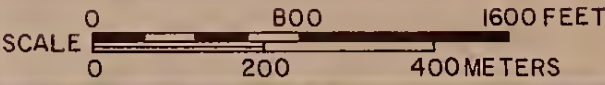
MATCH TO PLATE 13

MATCH TO PLATE 14

MATCH TO PLATE 17

- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV. 1151
  - STUDY LIMIT
  - CORPORATE LIMIT
  - RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 16 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



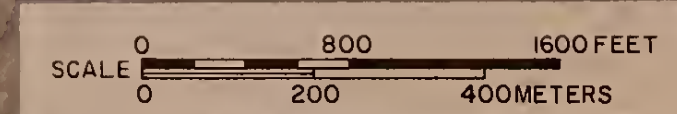




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- RM 83 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 17 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL













MATCH TO PLATE 18

R 51 W R 50 W

15 14  
22 23

13 18  
24 19

909

016

908

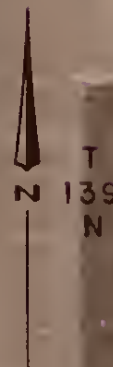
07

908

23 24  
26 25

24 19  
25 30

MATCH TO PLATE 20



MATCH TO PLATE 24

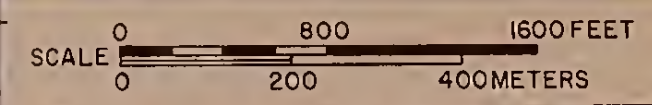
912

22 23  
27

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- RM 83 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 19 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



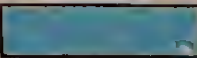



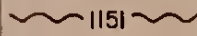





MATCH TO PLATE 19

R 51 W R 50 W



T 139  
2  
MATCH TO PLATE 25

- LEGEND**
-  500 YEAR FREQUENCY FLOOD
  -  100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  -  STREAM CHANNEL
  -  VALLEY SECTION
  -  ESTIMATED 100-YEAR FLOOD ELEV.
  -  STUDY LIMIT
  -  CORPORATE LIMIT
  -  RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 20 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

MATCH TO PLATE 34

END OF STUDY

909

909

909

910

912

914

27 26  
35

26 25  
35 36

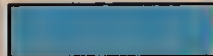

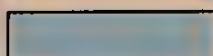



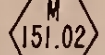

25 30  
36 31



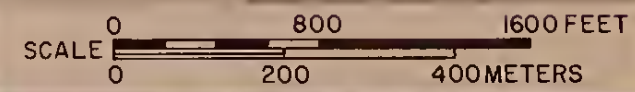




**LEGEND**

 500 YEAR FREQUENCY FLOOD	 1151 ESTIMATED 100-YEAR FLOOD ELEV.
 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)	 STUDY LIMIT
 STREAM CHANNEL	 CORPORATE LIMIT
 VALLEY SECTION	 RM B 3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS  
SWAN CREEK**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 21 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





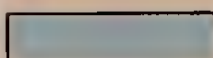



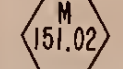



R 51 W  
MATCH TO PLATE 21

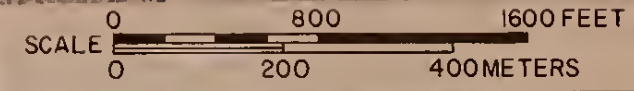


SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

**LEGEND**

	500 YEAR FREQUENCY FLOOD		ESTIMATED 100-YEAR FLOOD ELEV.
	100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)		STUDY LIMIT
	STREAM CHANNEL		CORPORATE LIMIT
	VALLEY SECTION		RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

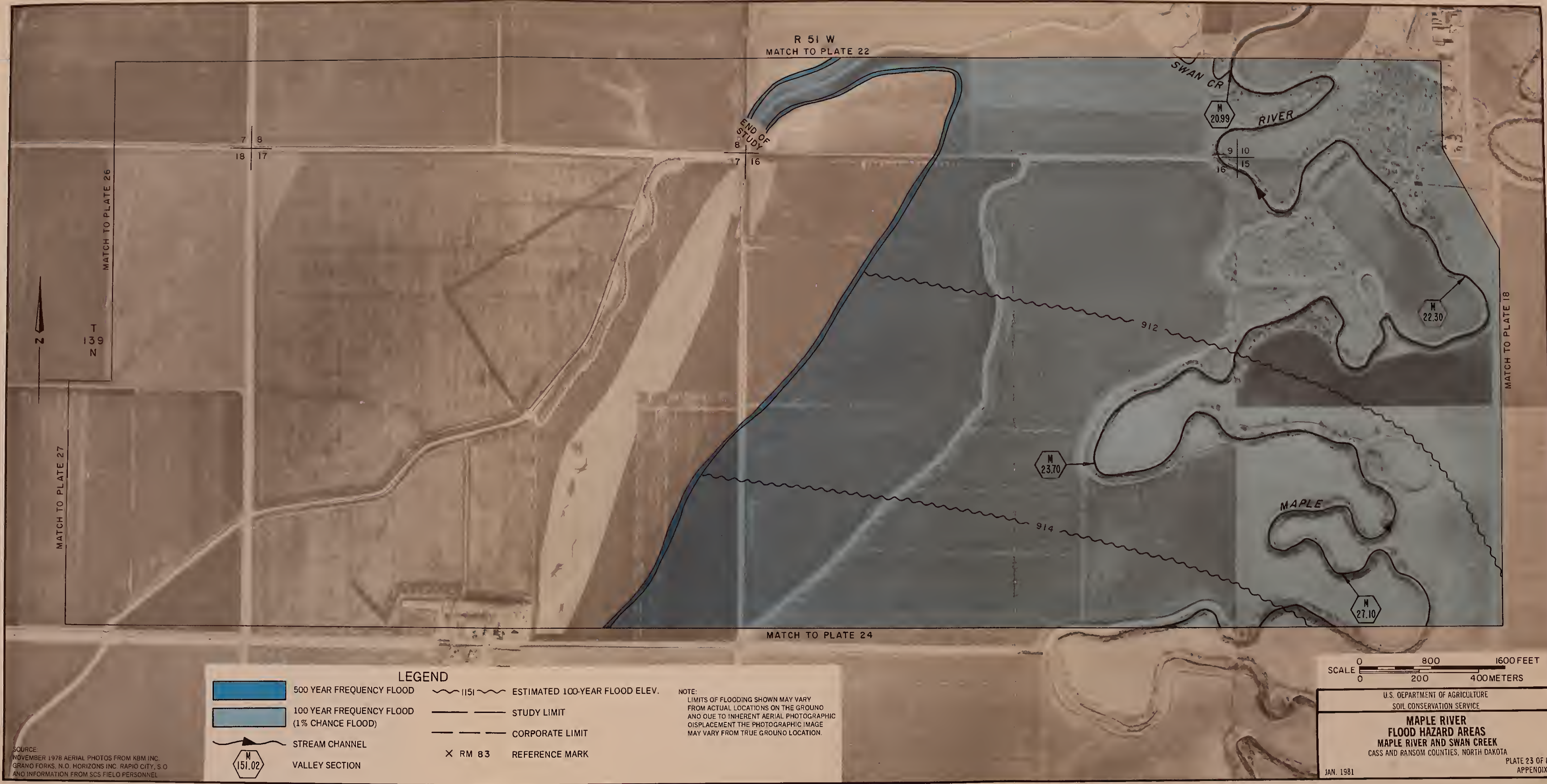
**MAPLE RIVER  
FLOOD HAZARD AREAS**  
MAPLE RIVER AND SWAN CREEK  
CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 22 OF 89  
APPENDIX A







SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

500 YEAR FREQUENCY FLOOD

100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)

STREAM CHANNEL

VALLEY SECTION

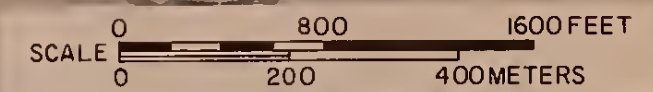
ESTIMATED 100-YEAR FLOOD ELEV.

STUDY LIMIT

CORPORATE LIMIT

REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**  
MAPLE RIVER AND SWAN CREEK  
CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

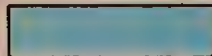
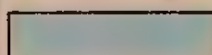


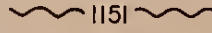



PLATE 23 OF 89  
APPENDIX A



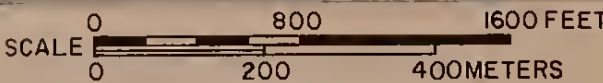




SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC, RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

<b>LEGEND</b>	
	500 YEAR FREQUENCY FLOOD
	100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
	STREAM CHANNEL
	VALLEY SECTION
	ESTIMATED 100-YEAR FLOOD ELEV.
	STUDY LIMIT
	CORPORATE LIMIT
	RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



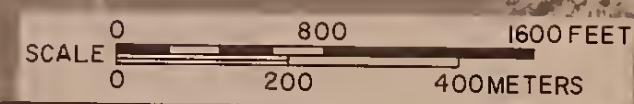
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
<b>MAPLE RIVER FLOOD HAZARD AREAS MAPLE RIVER AND BUFFALO CREEK CASS AND RANSOM COUNTIES, NORTH DAKOTA</b>	
JAN. 1981	PLATE 24 OF 89 APPENDIX A



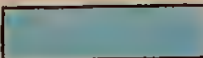
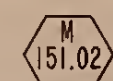


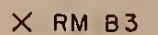






SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



**LEGEND**

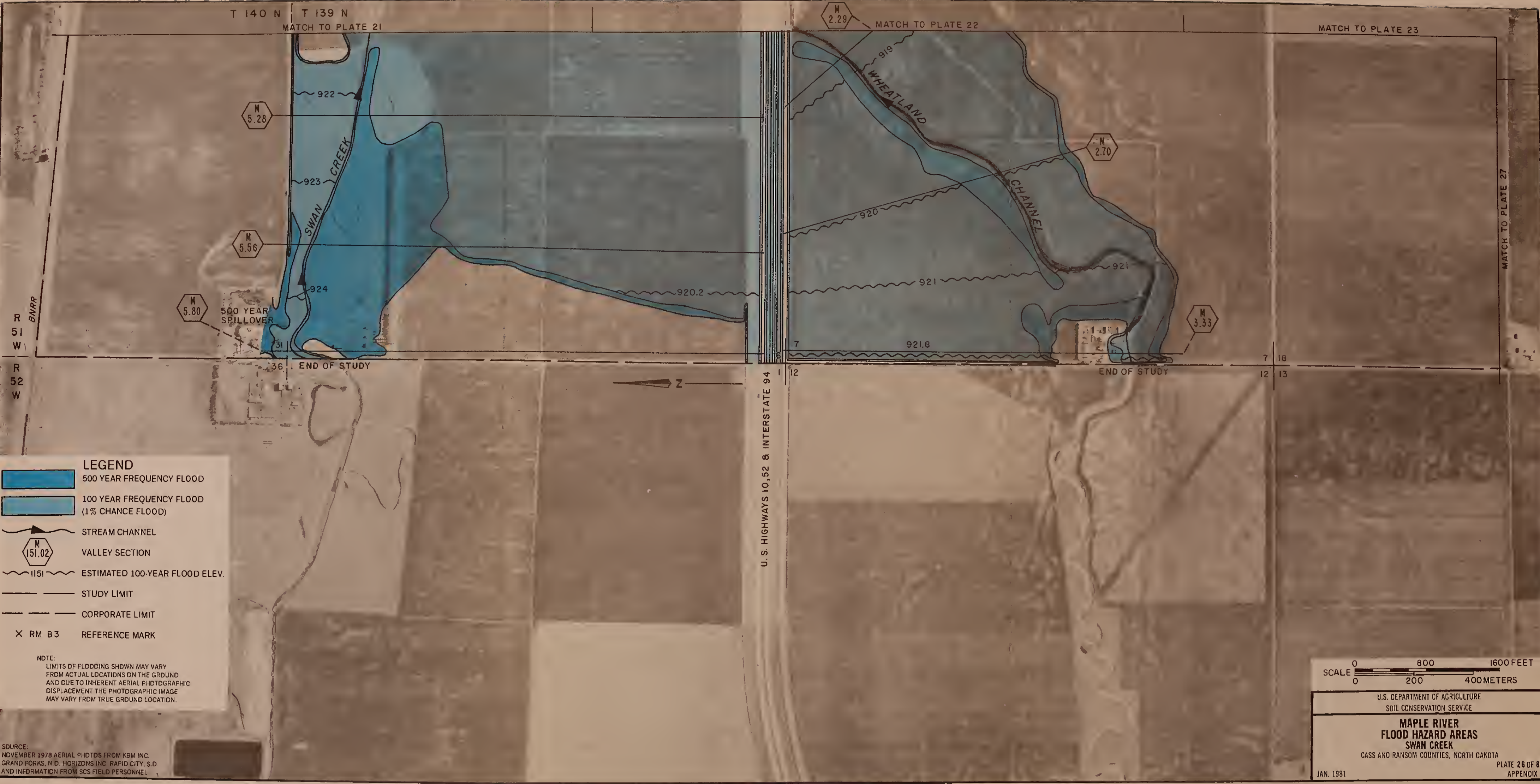
	500 YEAR FREQUENCY FLOOD		VALLEY SECTION		ESTIMATED 100-YEAR FLOOD ELEV.
	100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)		CORPORATE LIMIT		STUDY LIMIT
	STREAM CHANNEL				

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
<b>MAPLE RIVER FLOOD HAZARD AREAS</b> MAPLE RIVER AND BUFFALO CREEK CASS AND RANSOM COUNTIES, NORTH DAKOTA	
JAN. 1981	PLATE 25 OF 89 APPENDIX A







- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**MAPLE RIVER  
FLOOD HAZARD AREAS  
SWAN CREEK**  
CASS AND RANSOM COUNTIES, NORTH DAKOTA  
JAN. 1981  
PLATE 26 OF 89  
APPENDIX A







MATCH TO PLATE 23

MATCH TO PLATE 24

T 139 N

MATCH TO PLATE 25

MATCH TO PLATE 26

R 51 W  
R 52 W

18 19  
13 24

19 30  
24 25

30 31

MATCH TO PLATE 33

LEGEND

500 YEAR FREQUENCY FLOOD

100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)

STREAM CHANNEL

VALLEY SECTION

ESTIMATED 100-YEAR FLOOD ELEV.

STUDY LIMIT

CORPORATE LIMIT

X RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

SOURCE:  
NOVEMBER 1976 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

MATCH TO PLATE 28

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

MAPLE RIVER  
FLOOD HAZARD AREAS  
BUFFALO CREEK

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 27 OF 89  
APPENDIX A



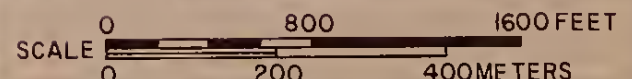




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS  
BUFFALO CREEK**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 28 OF 69  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





T 139 N  
MATCH TO PLATE 28

R  
52  
W

22 27  
21 28

MATCH TO PLATE 30

2

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

0 800 1600 FEET  
SCALE 0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS  
BUFFALO CREEK**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 29 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS  
BUFFALO CREEK**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 30 OF 88  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL











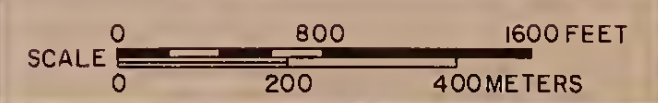




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS  
BUFFALO CREEK**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 32 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







R 52 W | R 51 W

MATCH TO PLATE 27

MATCH TO PLATE 25

DURBIN

BURR

RIVER

920

MATCH TO PLATE 28

T  
139  
N

922

36

31

31

32

32

33

T  
138  
N


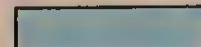

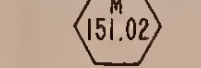


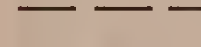
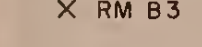
MATCH TO PLATE 34

M  
32.60

MAPLE

922

### LEGEND

-  500 YEAR FREQUENCY FLOOD
-  100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
-  STREAM CHANNEL
-  VALLEY SECTION
-  ESTIMATED 100-YEAR FLOOD ELEV.
-  STUDY LIMIT
-  CORPORATE LIMIT
-  RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

SOURCE:  
AERIAL PHOTOGRAPHY FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

MATCH TO PLATE 35

MATCH TO PLATE 36

SCALE  
0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 33 OF 89  
APPENDIX A





MATCH TO PLATE 25

R 51 W

MATCH TO PLATE 20

T  
139  
N  
T  
138  
E 3333 34  
4 334 35  
3 235 36  
2 1

816

916

914

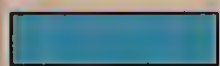
912

910

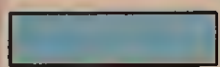
920

MATCH TO PLATE 36

## LEGEND



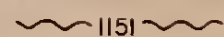
500 YEAR FREQUENCY FLOOD

100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)

STREAM CHANNEL



VALLEY SECTION



ESTIMATED 100-YEAR FLOOD ELEV.



STUDY LIMIT



CORPORATE LIMIT



REFERENCE MARK

NOTE:

LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNELSCALE 0 800 1600 FEET  
0 200 400 METERSU.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICEMAPLE RIVER  
FLOOD HAZARD AREAS

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 34 OF 89  
APPENDIX A





R 52 W R 51

MATCH TO PLATE 33



T 138 N

7 8

4 9

M 35.00

RM M-31

924

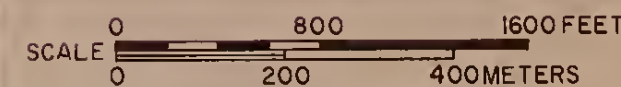
MATCH TO PLATE 37

MATCH TO PLATE 35

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK X RM B3

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 35 OF 89  
APPENDIX A





MATCH TO PLATE 33

R 51 W

MATCH TO PLATE 34

MATCH TO PLATE 35

MATCH TO PLATE 38

- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 36 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.O.  
AND INFORMATION FROM SCS FIELD PERSONNEL







**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

0 800 1600 FEET  
SCALE 0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 37 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
A. INFORMATION FROM SCS FIELD PERSONNEL

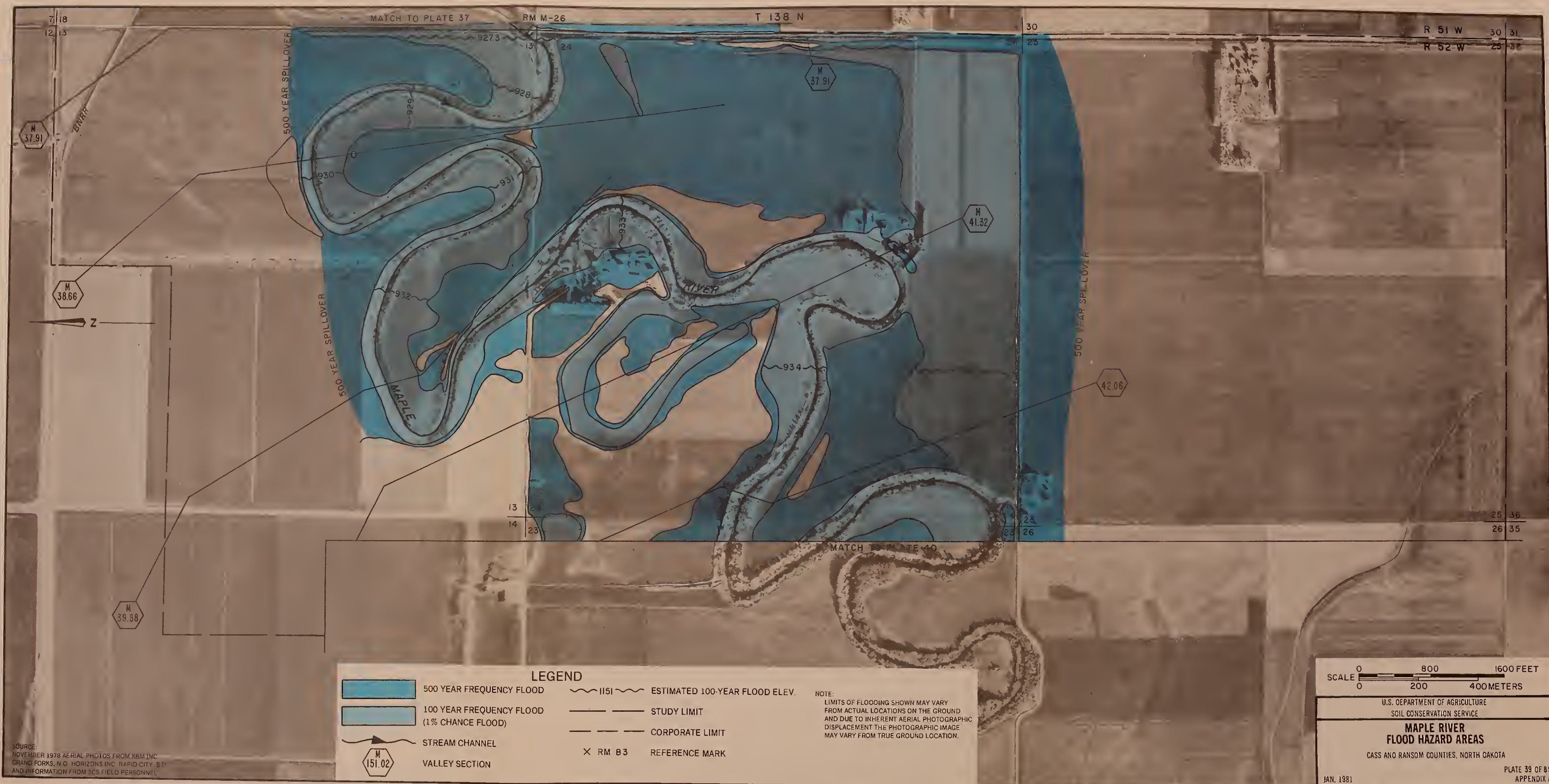


















T 138 N  
MATCH TO PLATE 39

R  
52  
W

M  
43.9

M  
45.76

M  
45.84

14

15

RM UE

938.9

7

23

27

STATE HIGHWAY 18

M  
46.40

M  
47.06

MATCH TO PLATE 40

# LEGEND

500 YEAR FREQUENCY FLOOD

100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)

STREAM CHANNEL

VALLEY SECTION

ESTIMATED 100-YEAR FLOOD ELEV.

STUDY LIMIT

CORPORATE LIMIT

X RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

MAPLE RIVER  
FLOOD HAZARD AREAS

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 40 OF 89  
APPENDIX A









**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100 YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK X RM B3

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

0 800 1600 FEET  
SCALE 0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 41 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM IN  
GRAND FORT RICHARD, N.D.

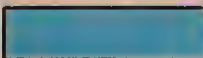

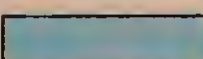



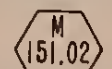





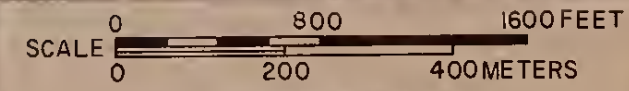


SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM, INC.  
GRAND FORKS, N.D. HORIZONS, INC., RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

**LEGEND**

	500 YEAR FREQUENCY FLOOD		ESTIMATED 100-YEAR FLOOD ELEV.
	100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)		STUDY LIMIT
	STREAM CHANNEL		CORPORATE LIMIT
	VALLEY SECTION		RM 83 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 42 OF 89  
APPENDIX A













T 138 N

MATCH TO PLATE 43

100 YR SPILLOVER

500 YEAR SPILLOVER

**LEGEND**

500 YEAR FREQUENCY FLOOD

100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)

STREAM CHANNEL

VALLEY SECTION

ESTIMATED 100-YEAR FLOOD ELEV.

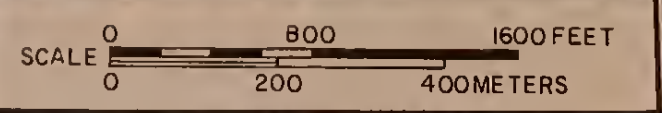
STUDY LIMIT

CORPORATE LIMIT

X RM 83

REFERENCE MARK

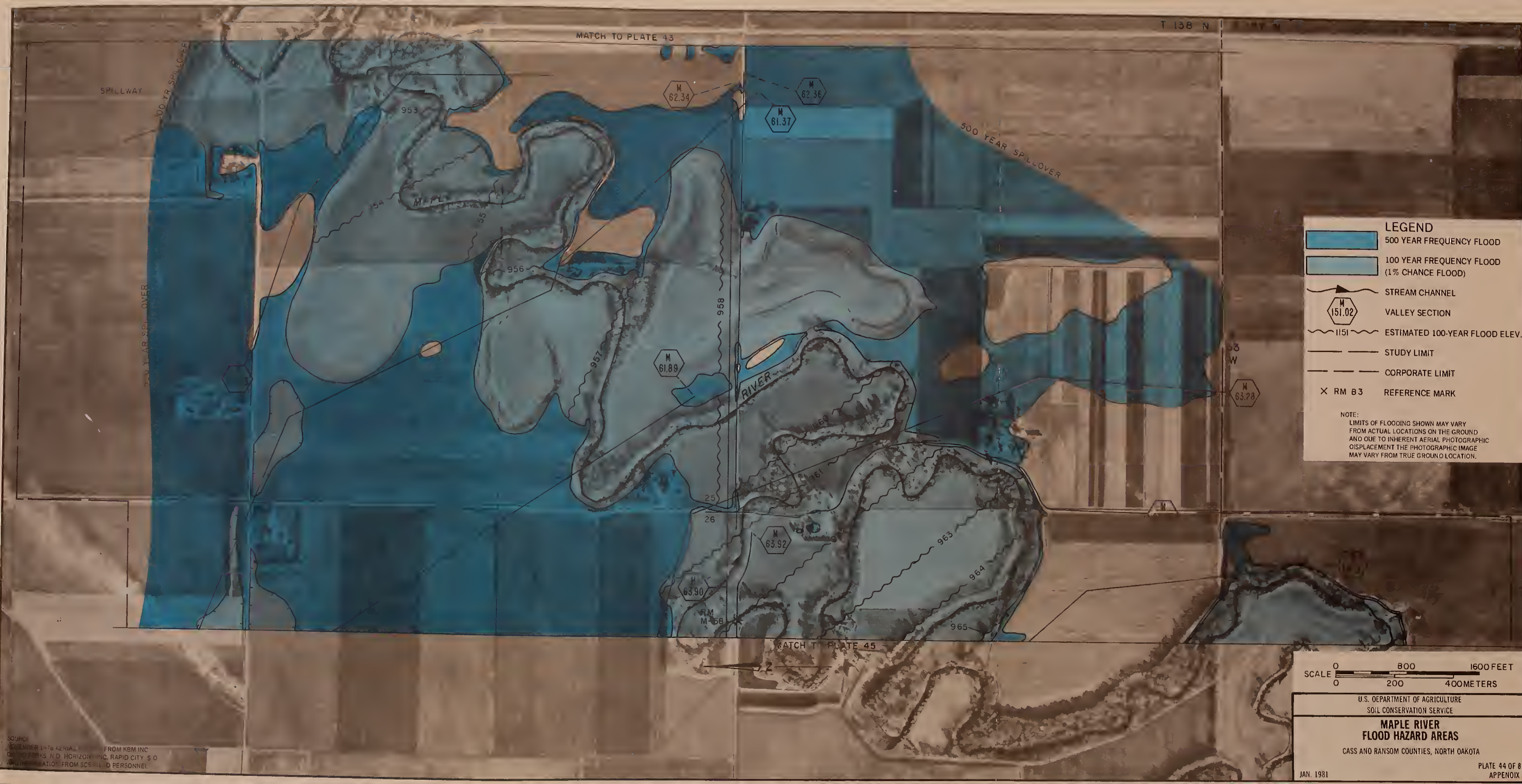
NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**  
CASS AND RANSOM COUNTIES, NORTH DAKOTA

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOGRAPHY FROM KBM INC.  
GROUND FOR S. N. D. HORIZON, INC., RAPID CITY, S. D.  
AND INFORMATION FROM SCS FIELD PERSONNEL









T 136 N 137 N

MATCH TO PLATE 44

500 YR  
SPILL OVER

M  
61.37

M  
63.28

M  
66.15

M  
63.90

M  
63.92

M  
68.63

M  
61.89

M  
69.63

M  
70.56

M  
71.11

R  
53  
W

23 26  
22 27

26 35  
27 4

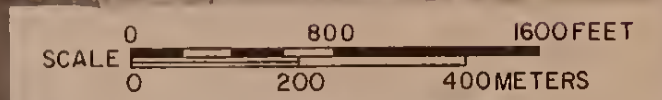
35 2  
34 3

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- X RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRANDFORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 45 OF 89  
APPENDIX A

MATCH TO PLATE 46







**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.







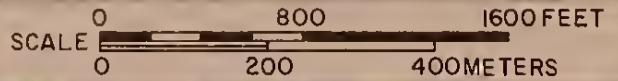




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- X RM 83 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 47 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORK, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL









**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CDRPORATE LIMIT
- REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 48 OF 89  
APPENDIX A





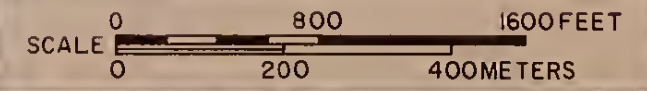




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOGRAPHY BY KBM INC.  
GRAND FORKS, N.D. HORIZON CITY, S.D.  
AND INFORMATION FROM SCS FIELD









**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM 83 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC, RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

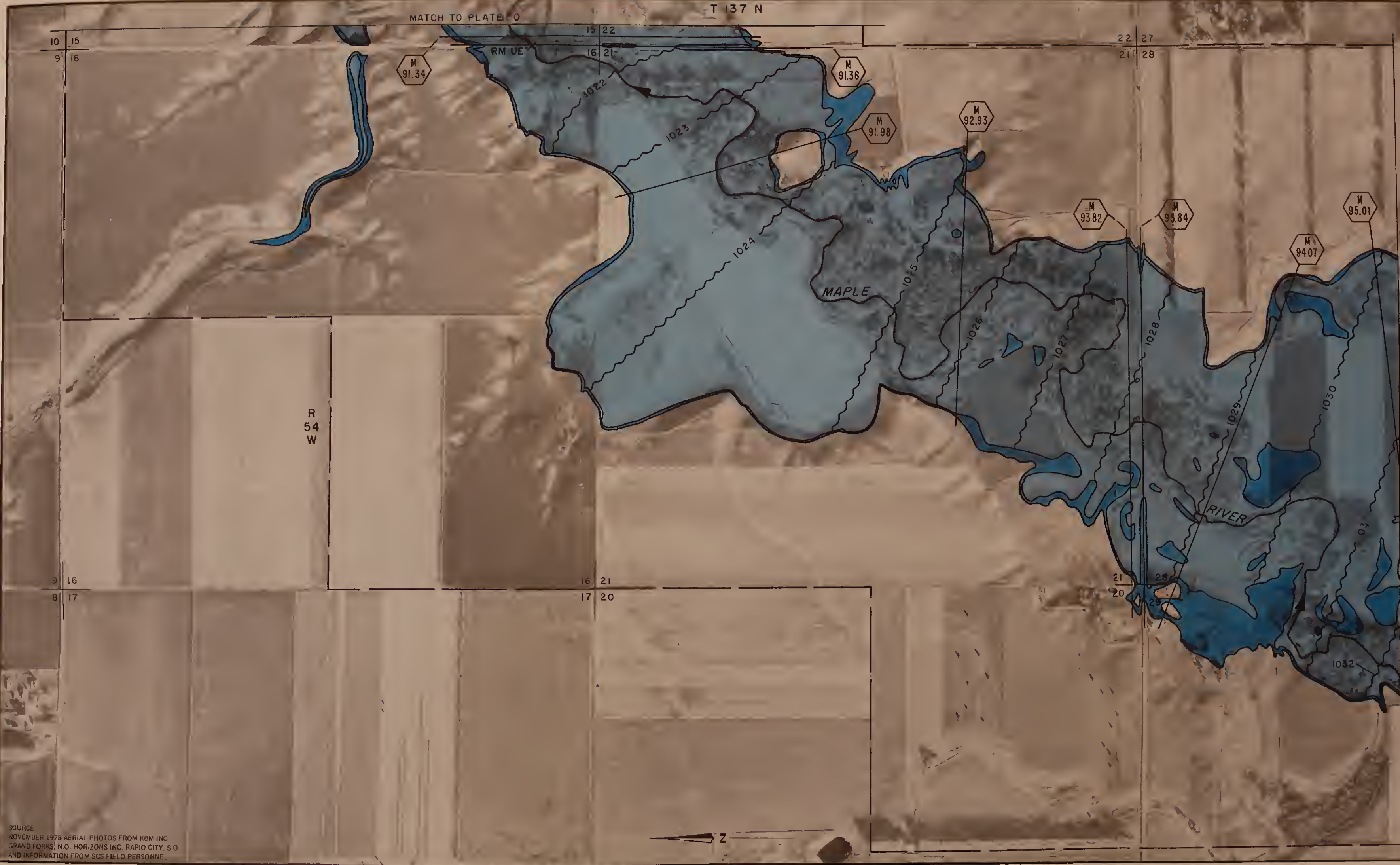
JAN. 1981

PLATE 50 OF 69  
APPENDIX A





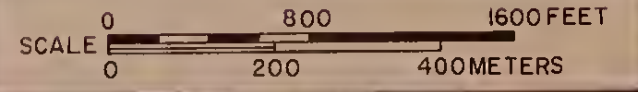




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 51 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





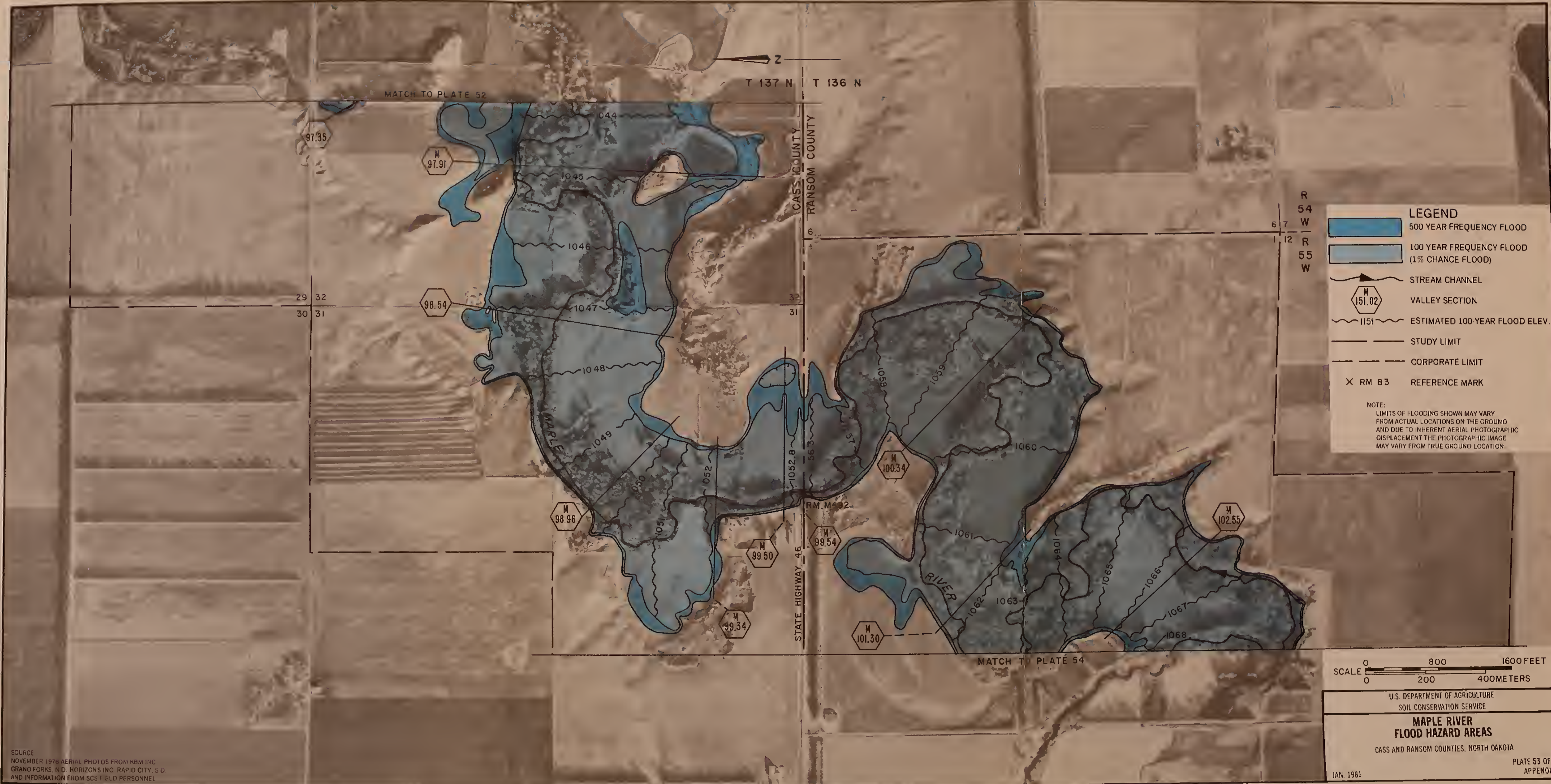








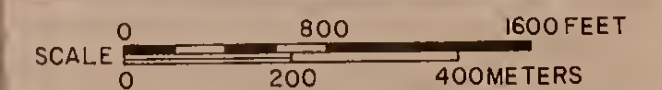




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK RM 83

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

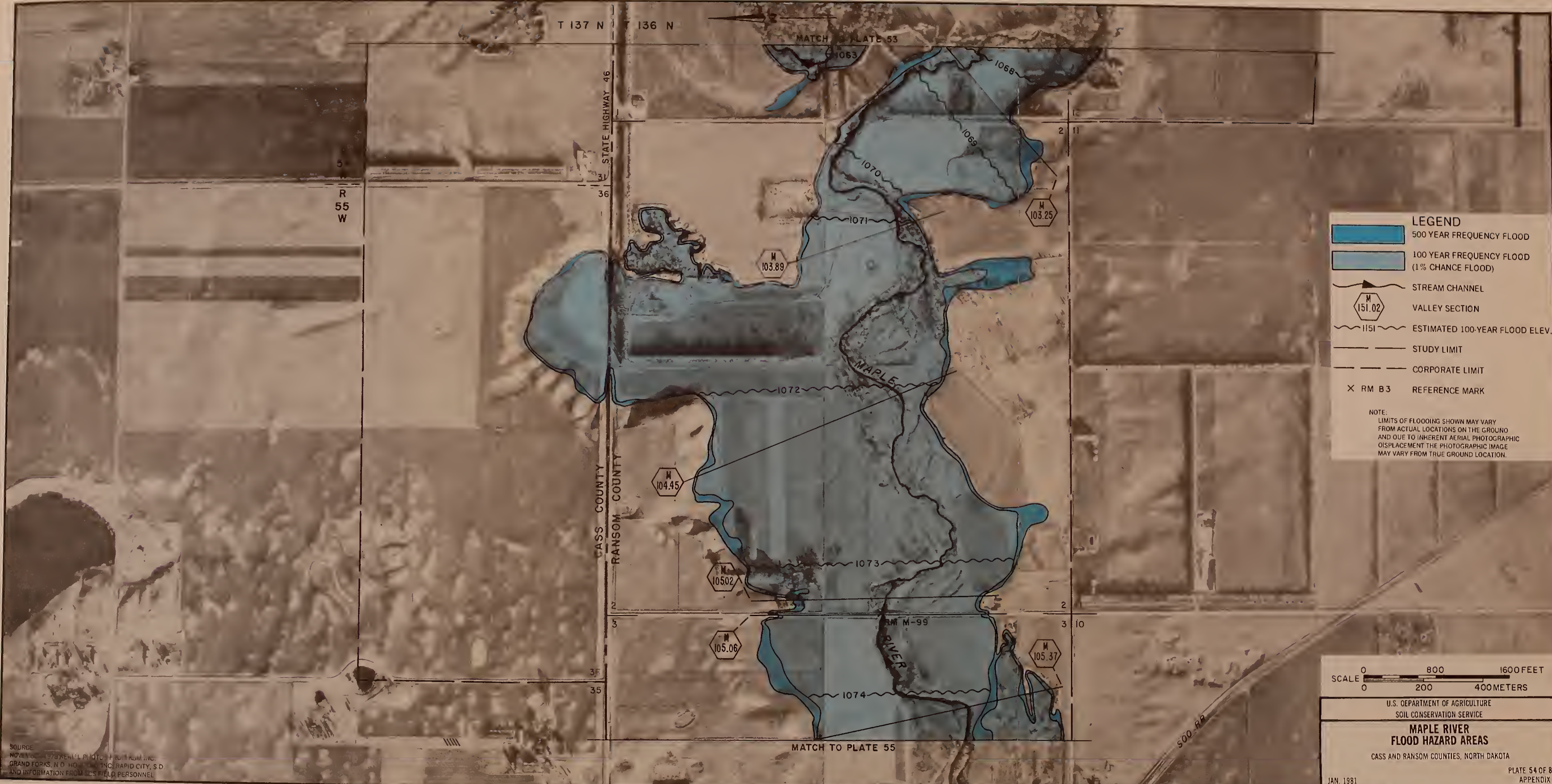
PLATE 53 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FLOOD PERSONNEL









**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 54 OF 89  
APPENDIX A

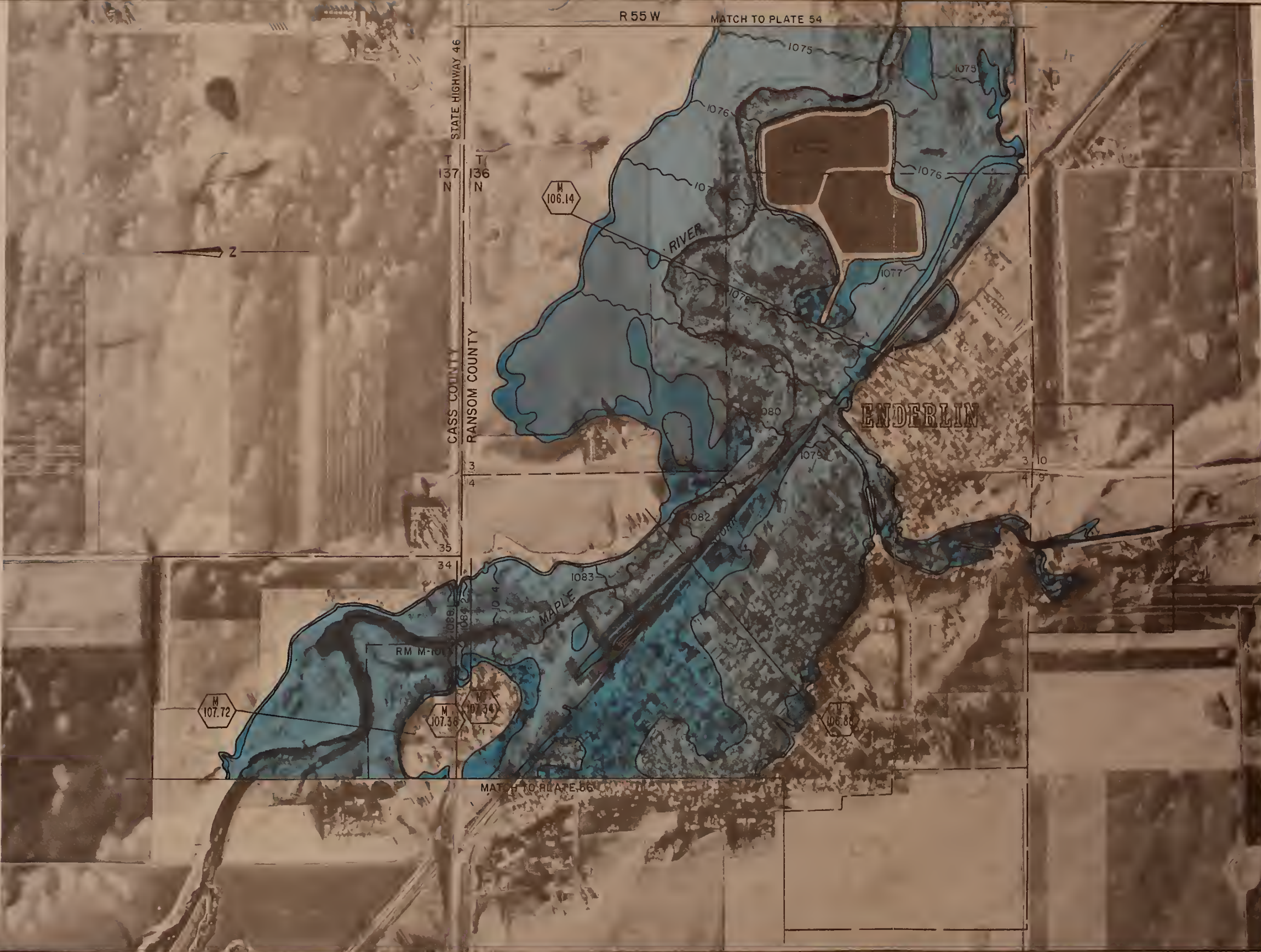
SOURCE:  
NOV. 1978 AERIAL PHOTOGRAPH FROM RCM, INC.  
GRAND FORKS, N.D. HO. 100-100, INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM 83 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

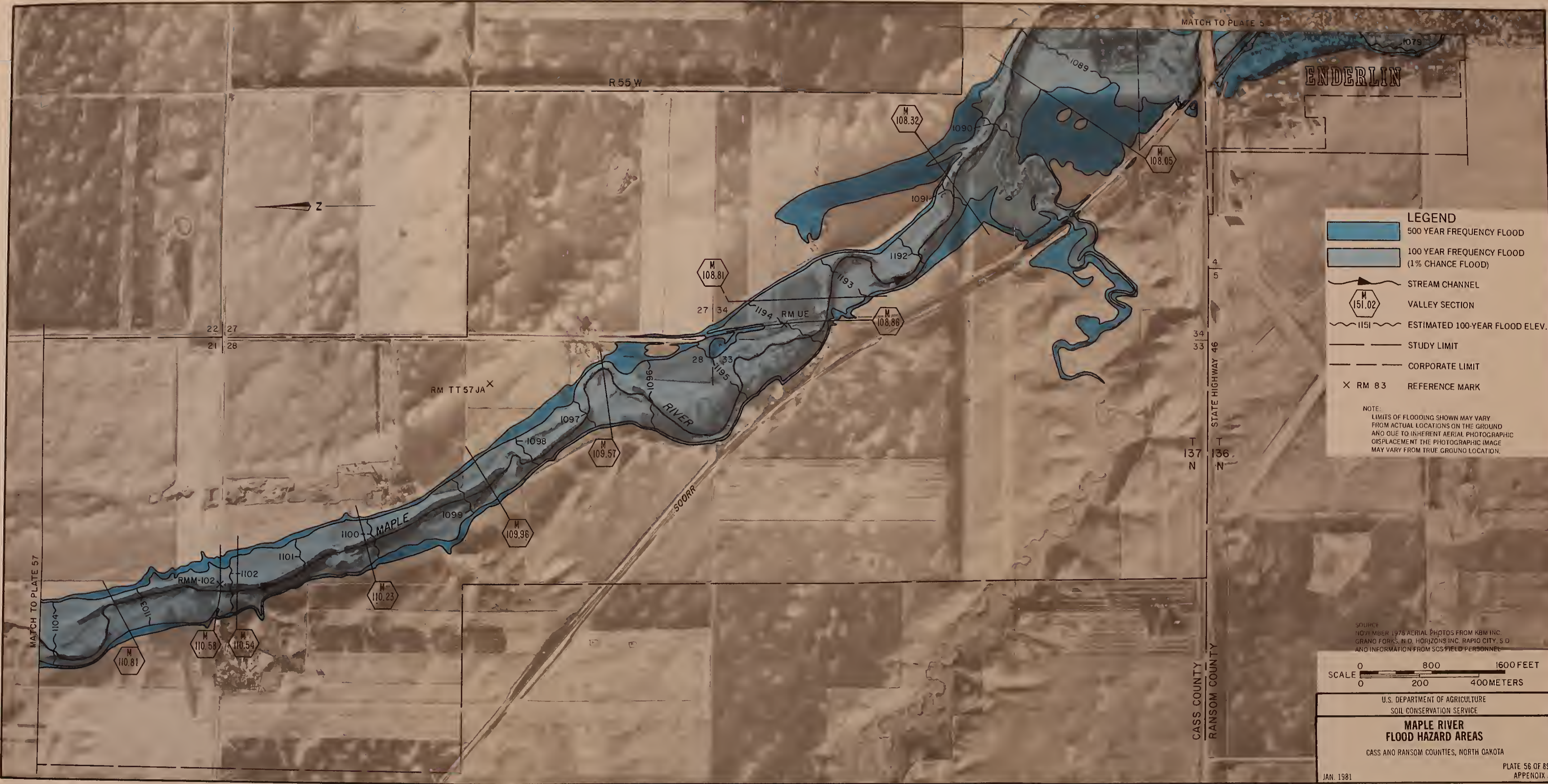
**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA









**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

SCALE

0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 56 OF 89  
APPENDIX A









SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

500 YEAR FREQUENCY FLOOD

100 YEAR FREQUENCY FLOOD  
(1% CHANCE FLOOD)

STREAM CHANNEL

VALLEY SECTION

1151

ESTIMATED 100 YEAR FLOOD ELEV.

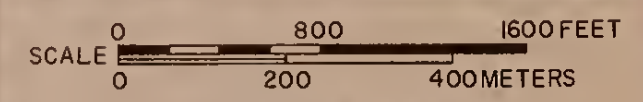
STUDY LIMIT

CORPORATE LIMIT

X RM B3

REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**  
CASS AND RANSOM COUNTIES, NORTH DAKOTA

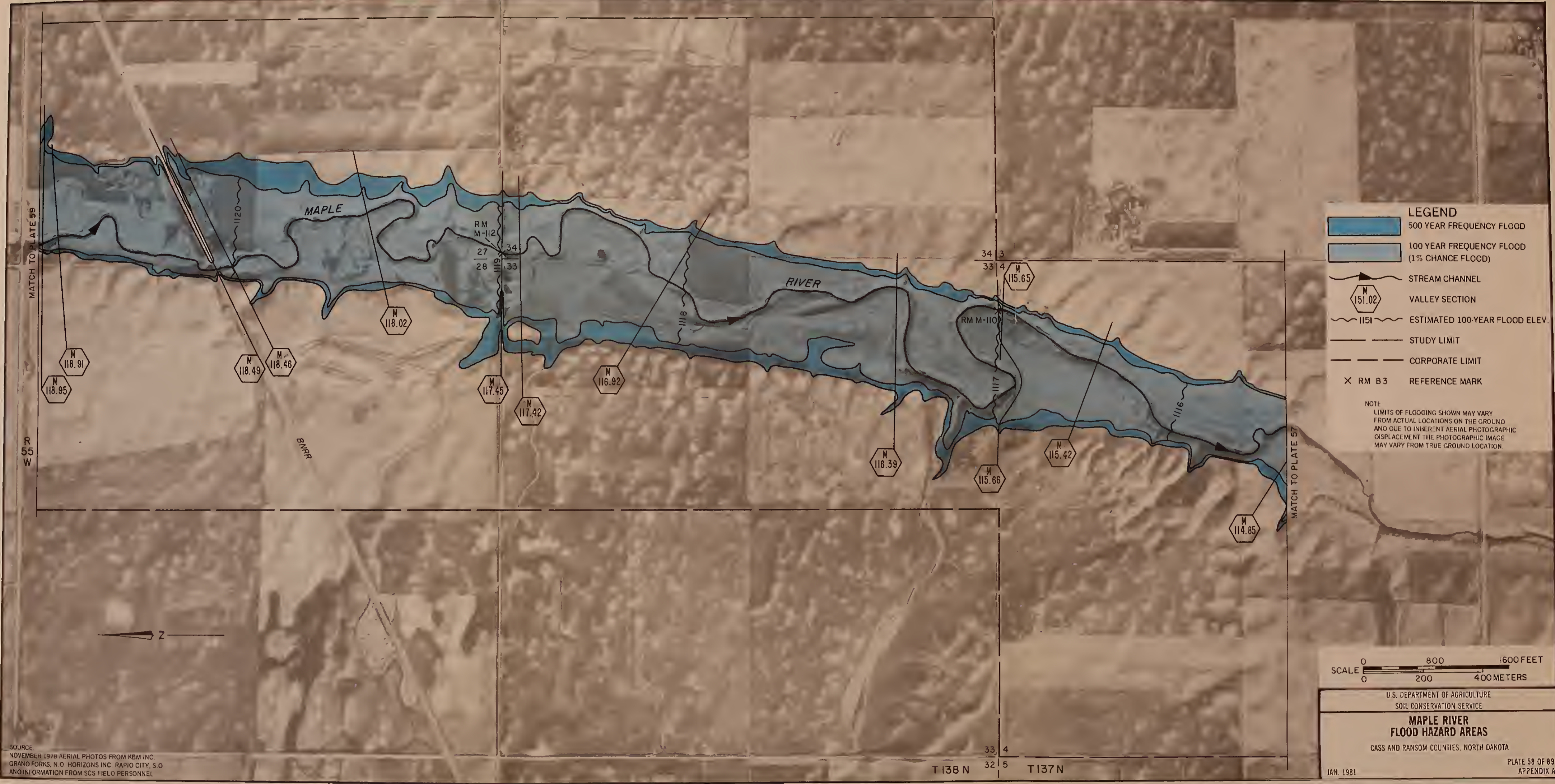
JAN. 1981

PLATE 5T OF 89  
APPENDIX A





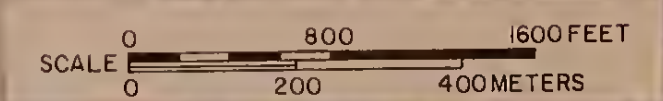




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 58 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





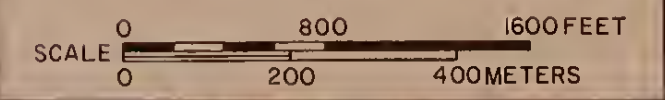




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B 3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

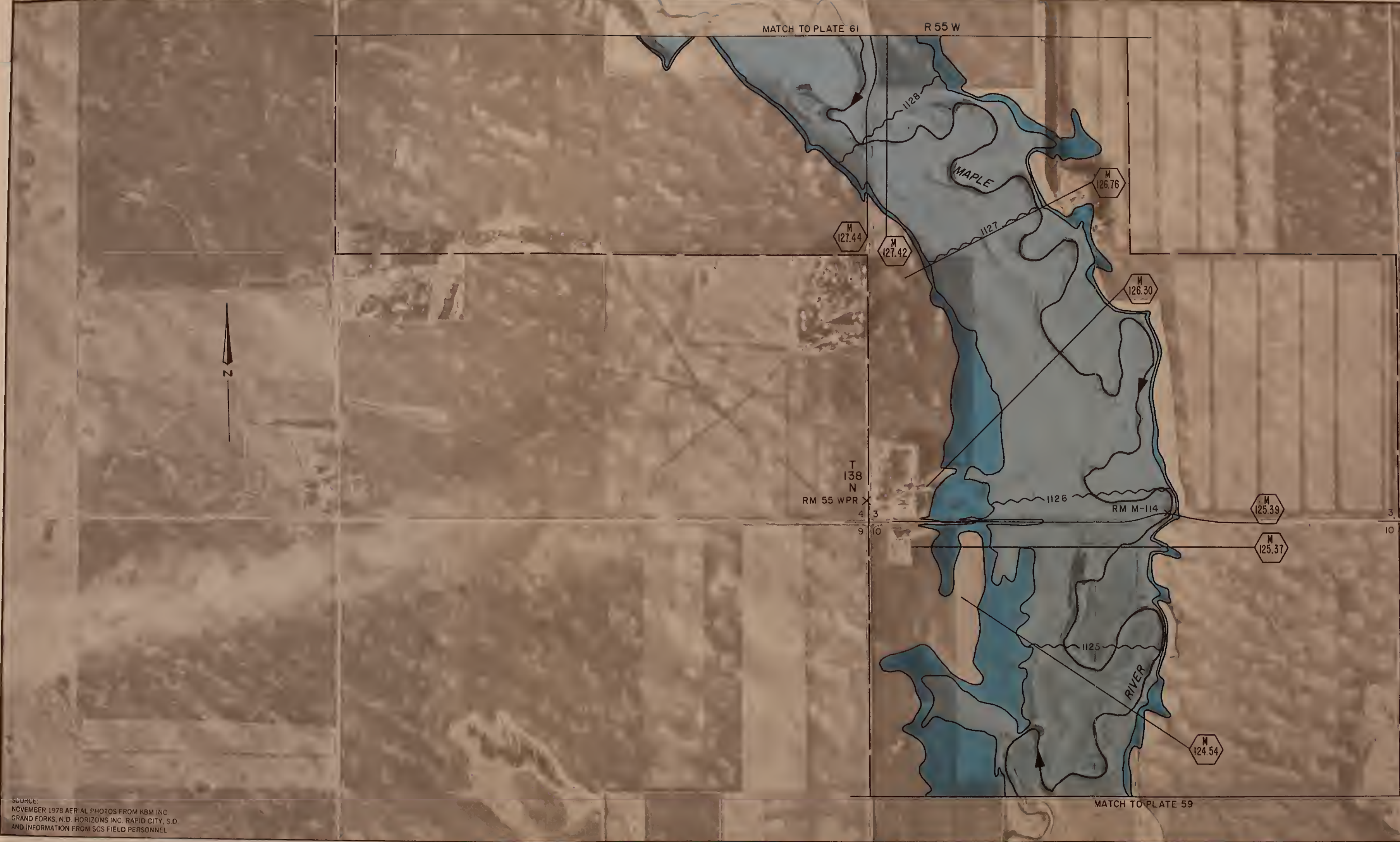
PLATE 59 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





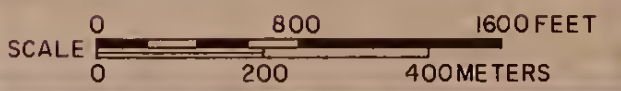




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

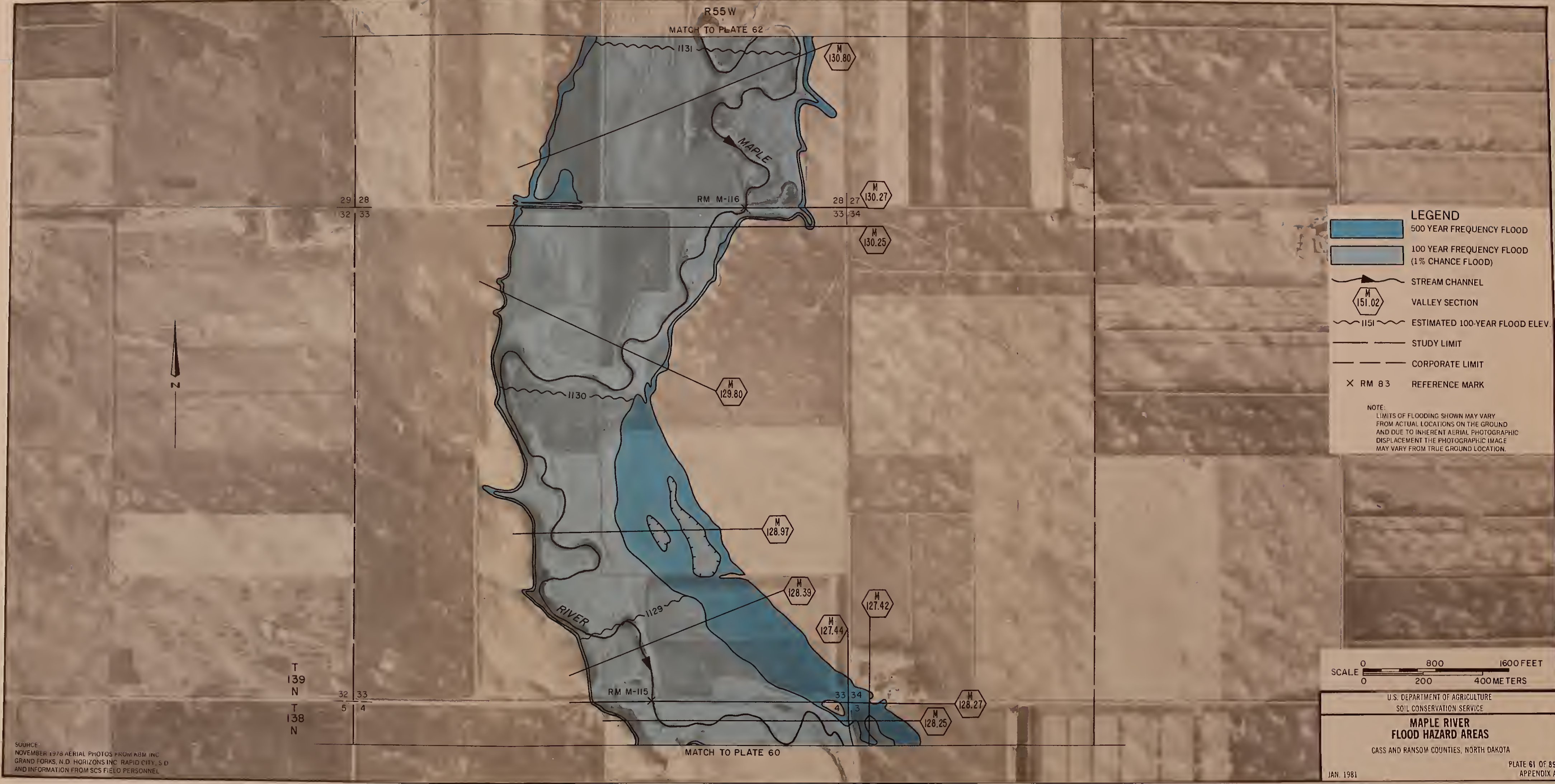
**MAPLE RIVER  
FLOOD HAZARD AREAS**  
CASS AND RANSOM COUNTIES, NORTH DAKOTA

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL









SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



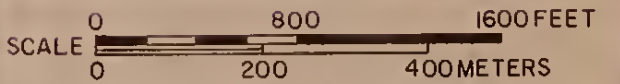




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- X RM 83 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

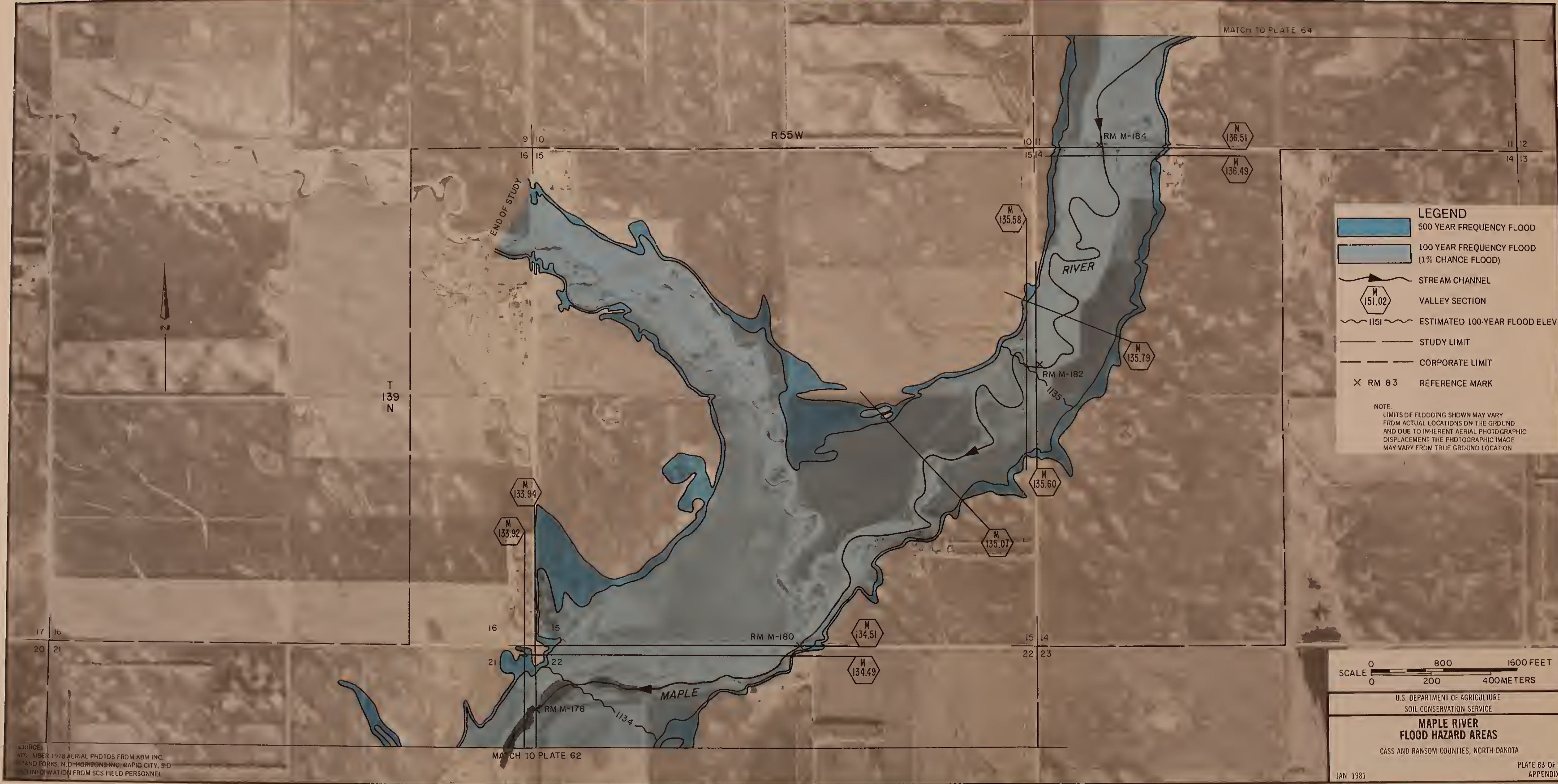
JAN. 1981

PLATE 62 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM 83 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

**SCALE**

0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 63 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
AND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
NO INFORMATION FROM SCS FIELD PERSONNEL







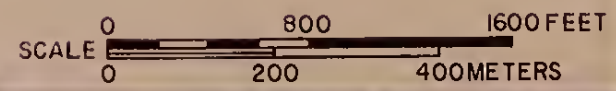


SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- X RM 83 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

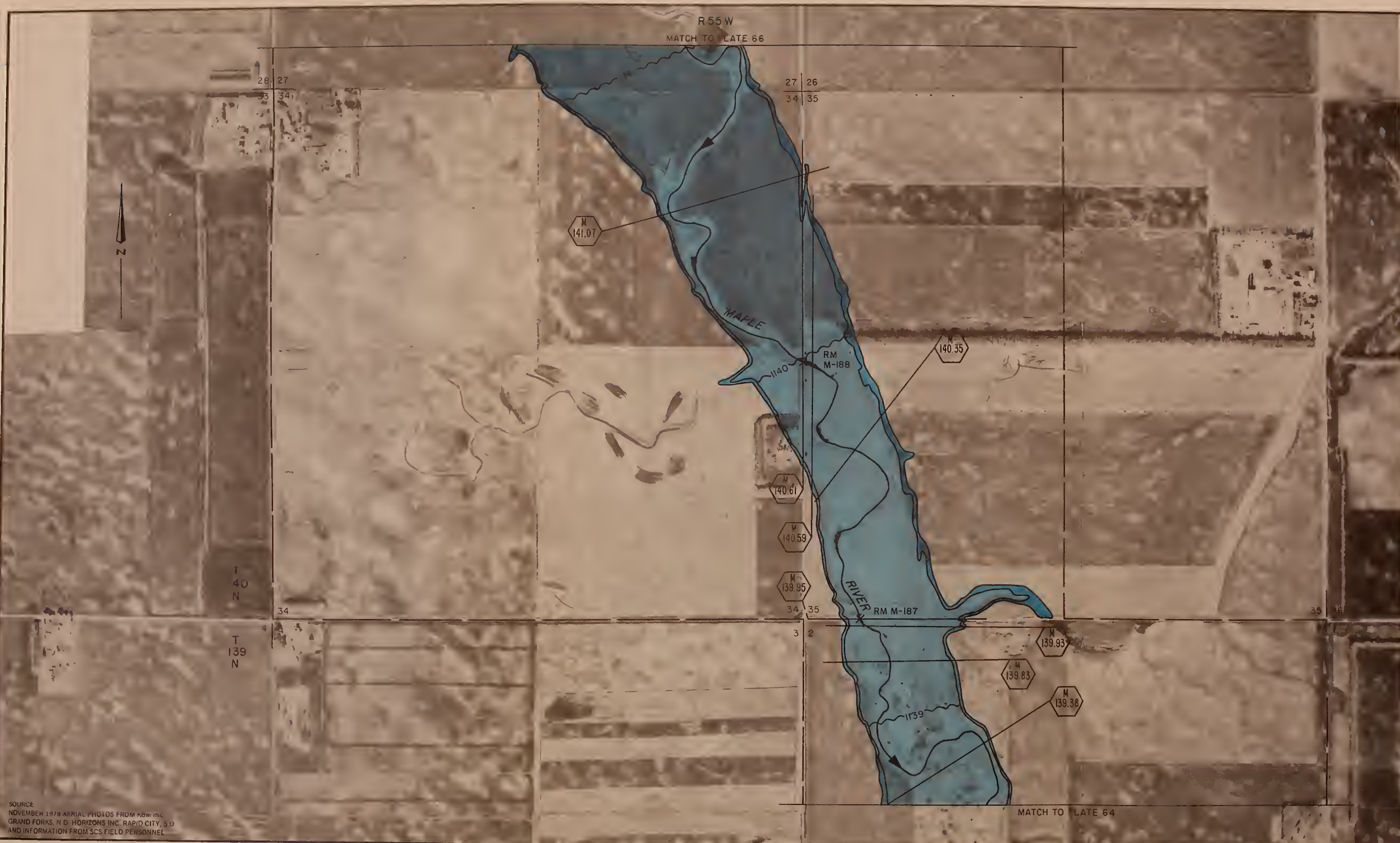
JAN. 1981

PLATE 64 OF 89  
APPENDIX A









- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - RM 83 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

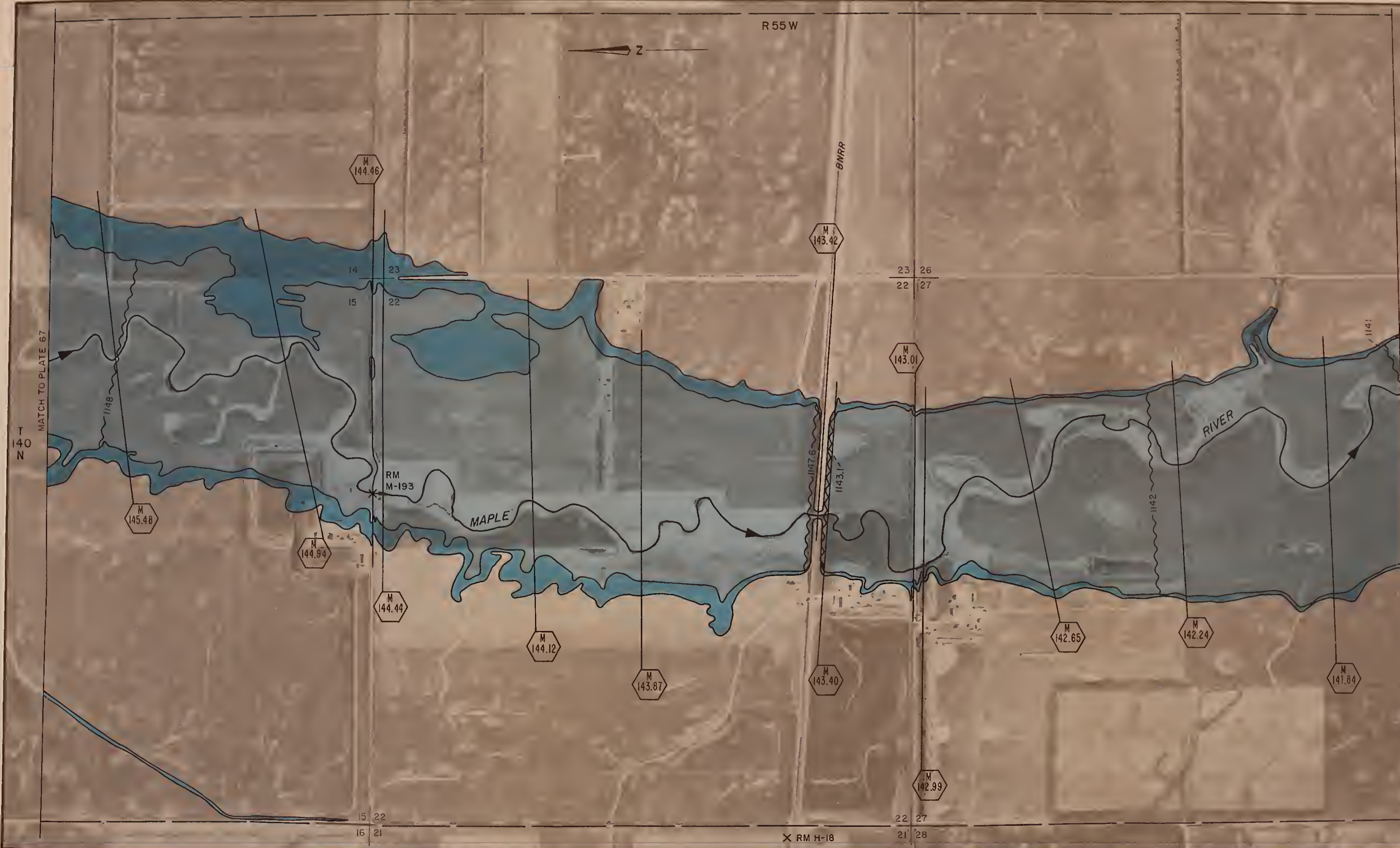
PLATE 65 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM ABW INC.  
GRAND FORKS, N.D. HORIZONS INC., RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







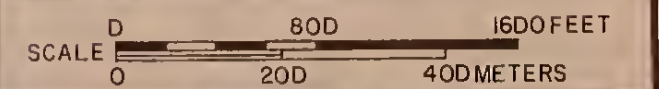


**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUOY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

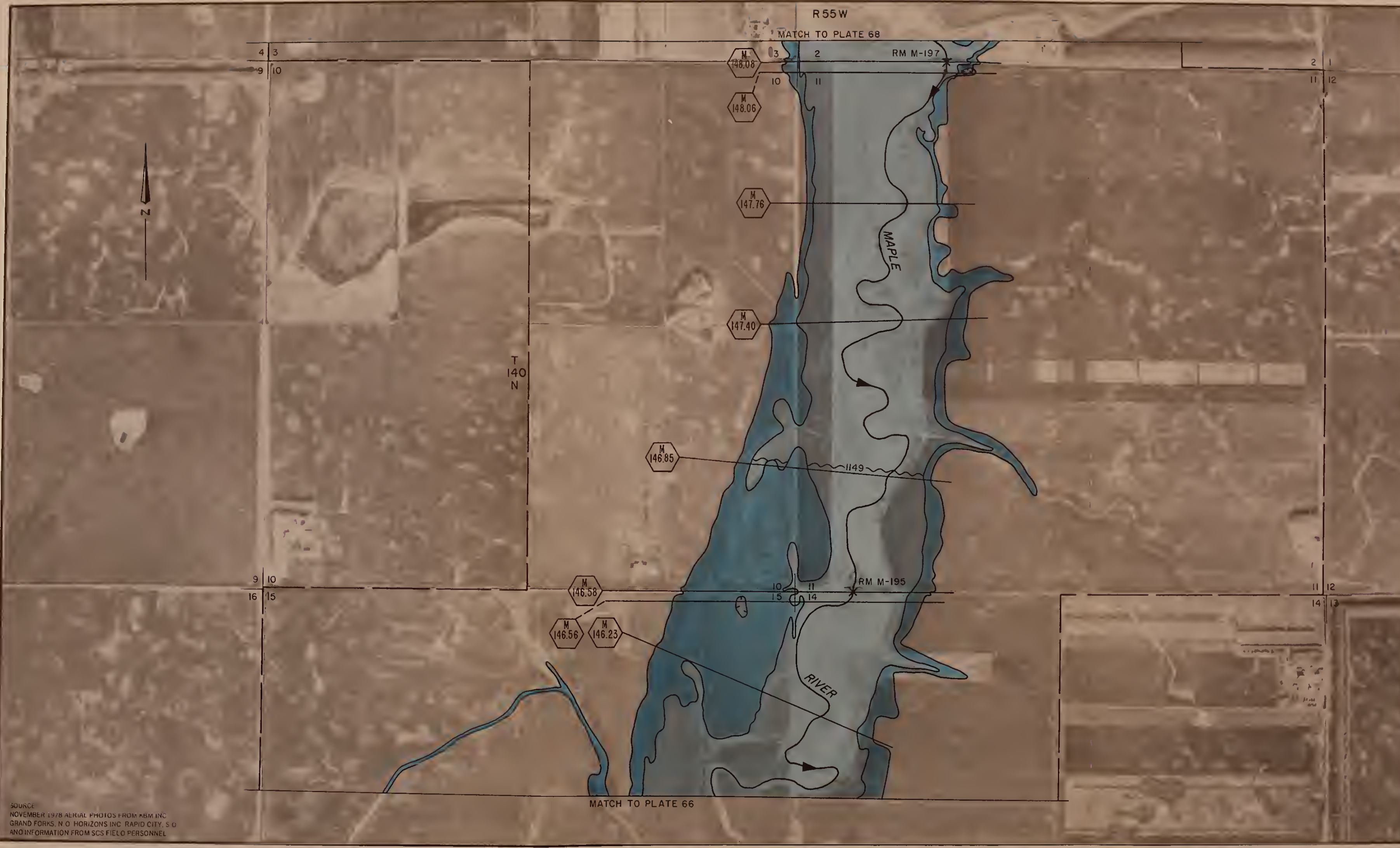
CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 66 OF 69  
APPENDIX A

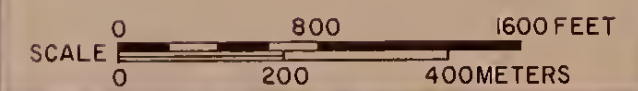






- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN 1981

PLATE 67 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





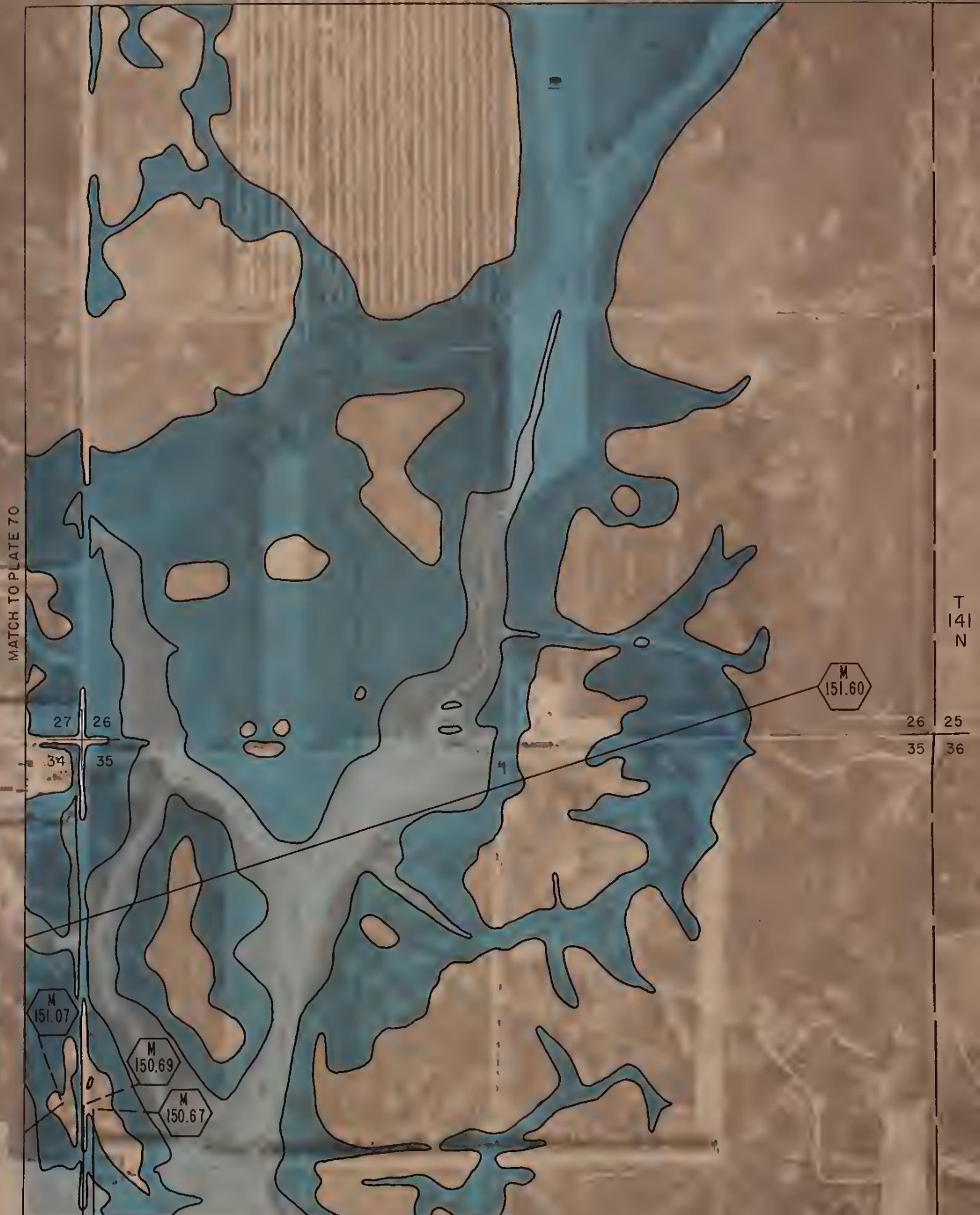








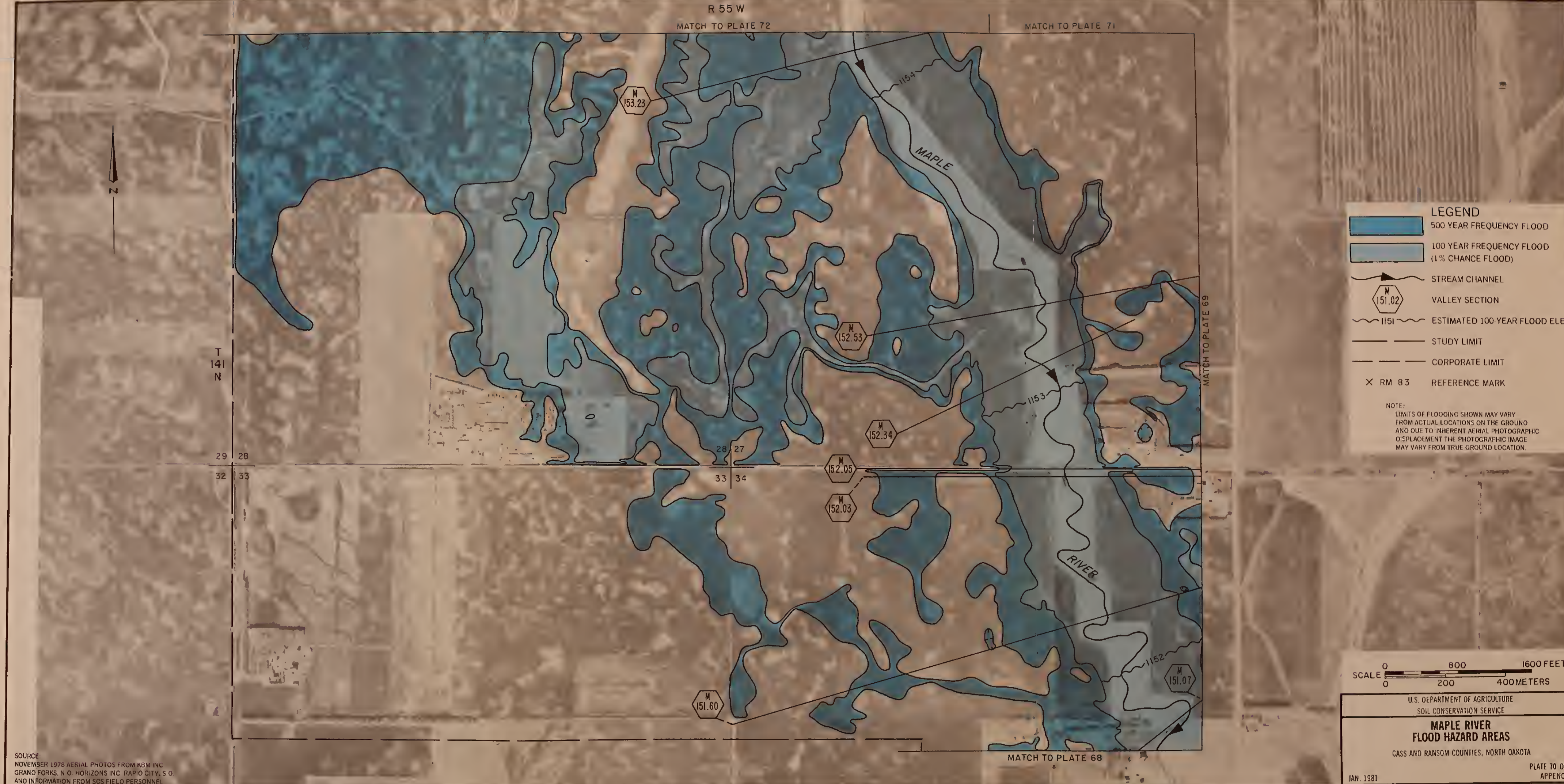
R55W  
MATCH TO PLATE 71



SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



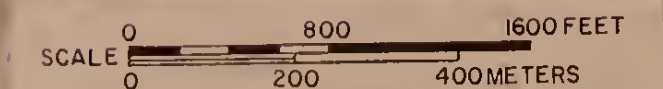




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- RM 83 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 70 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







R 55 W  
MATCH TO PLATE 73



- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 71 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

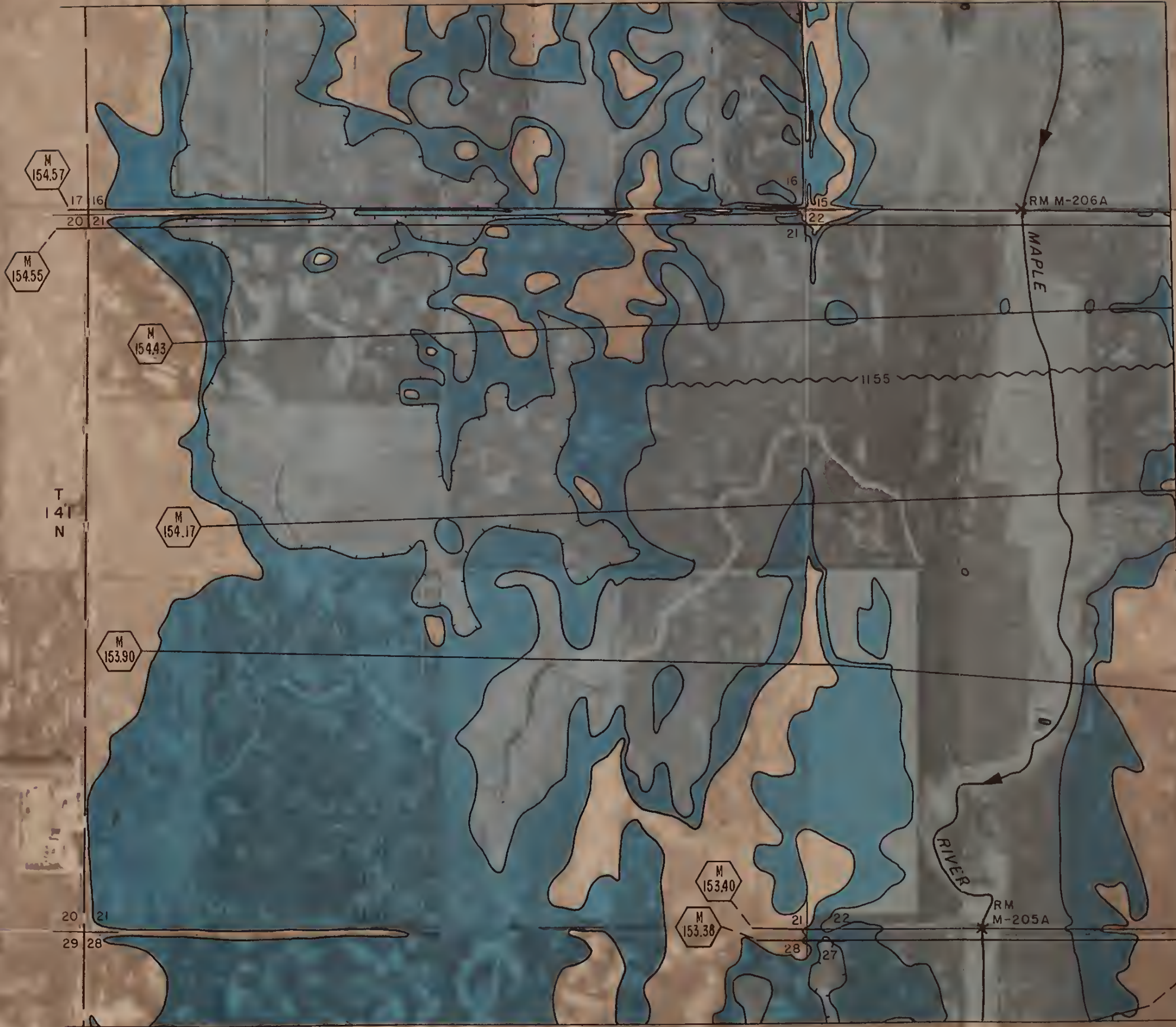
MATCH TO PLATE 70

MATCH TO PLATE 69





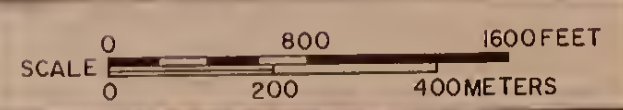
R 55 W  
MATCH TO PLATE 74



**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 72 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL









MATCH TO PLATE 75

R 55 W | R 54 W

14 T  
N  
MATCH TO PLATE 74

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC, RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

MATCH TO PLATE 71

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**MAPLE RIVER  
FLOOD HAZARD AREAS**  
CASS AND RANSOM COUNTIES, NORTH DAKOTA  
JAN. 1981  
PLATE T3 OF 89  
APPENDIX A

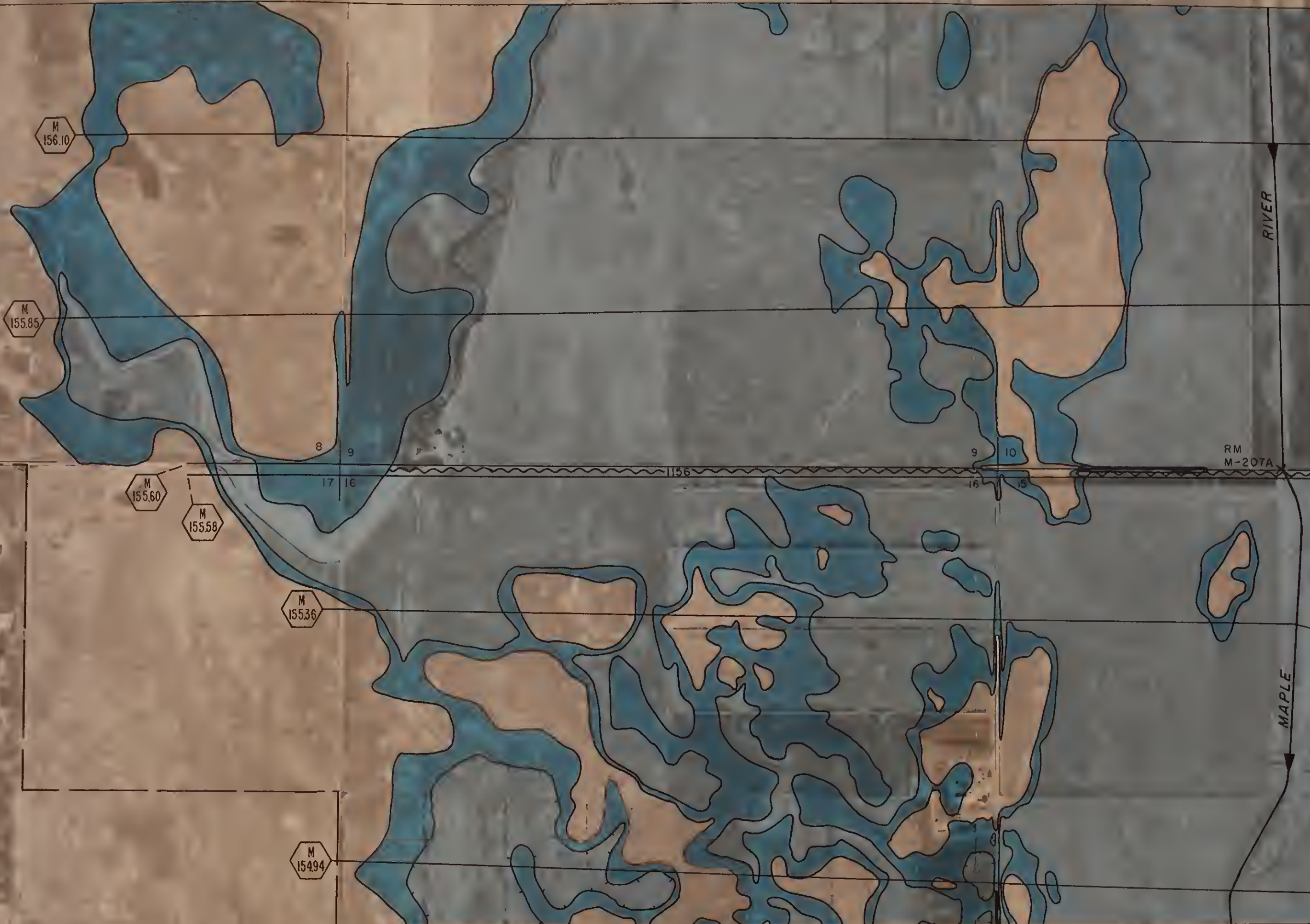




R 55 W

MATCH TO PLATE 76

MATCH TO PLATE 75



- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - REFERENCE MARK

**NOTE**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 74 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





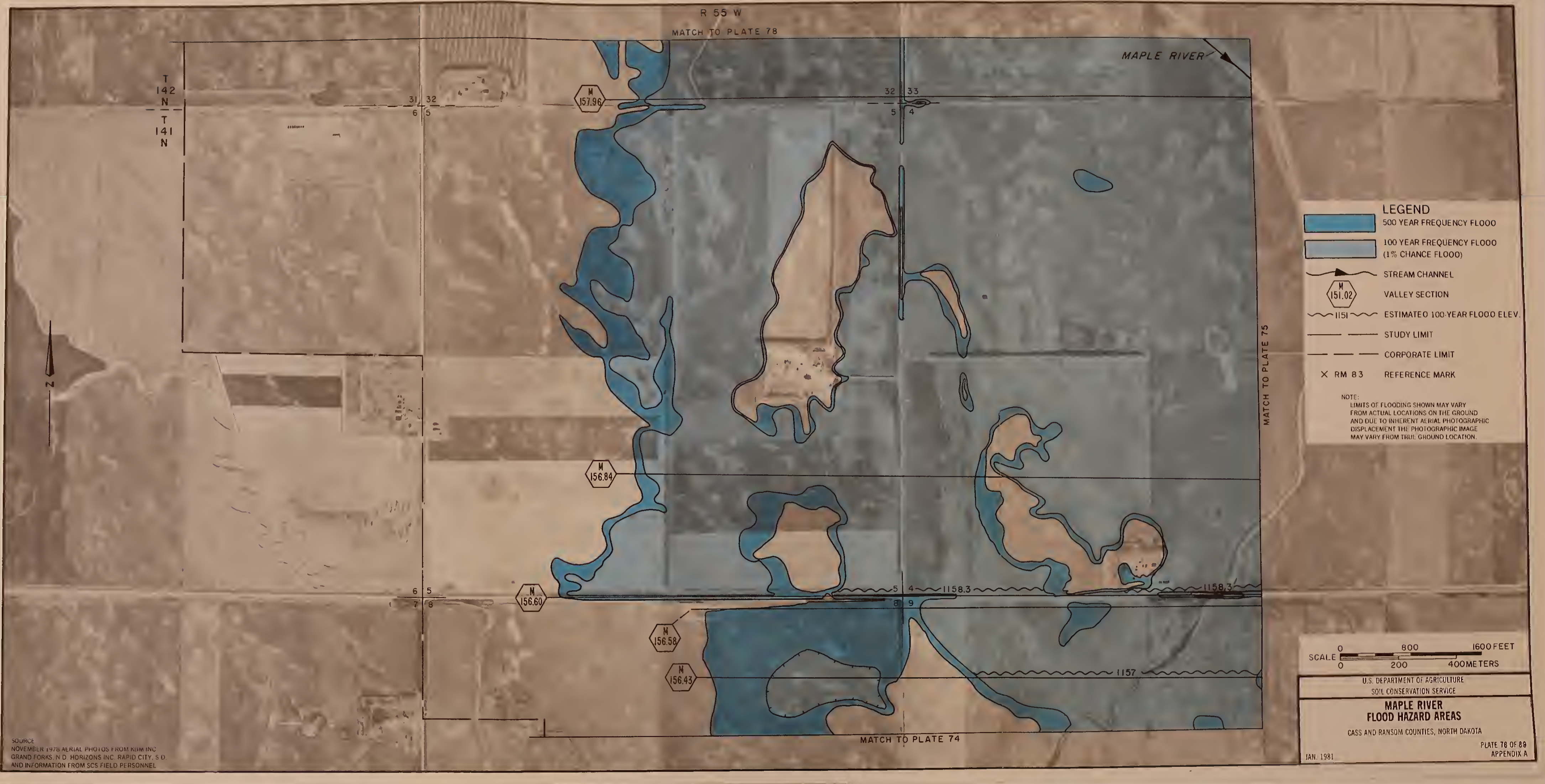




SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





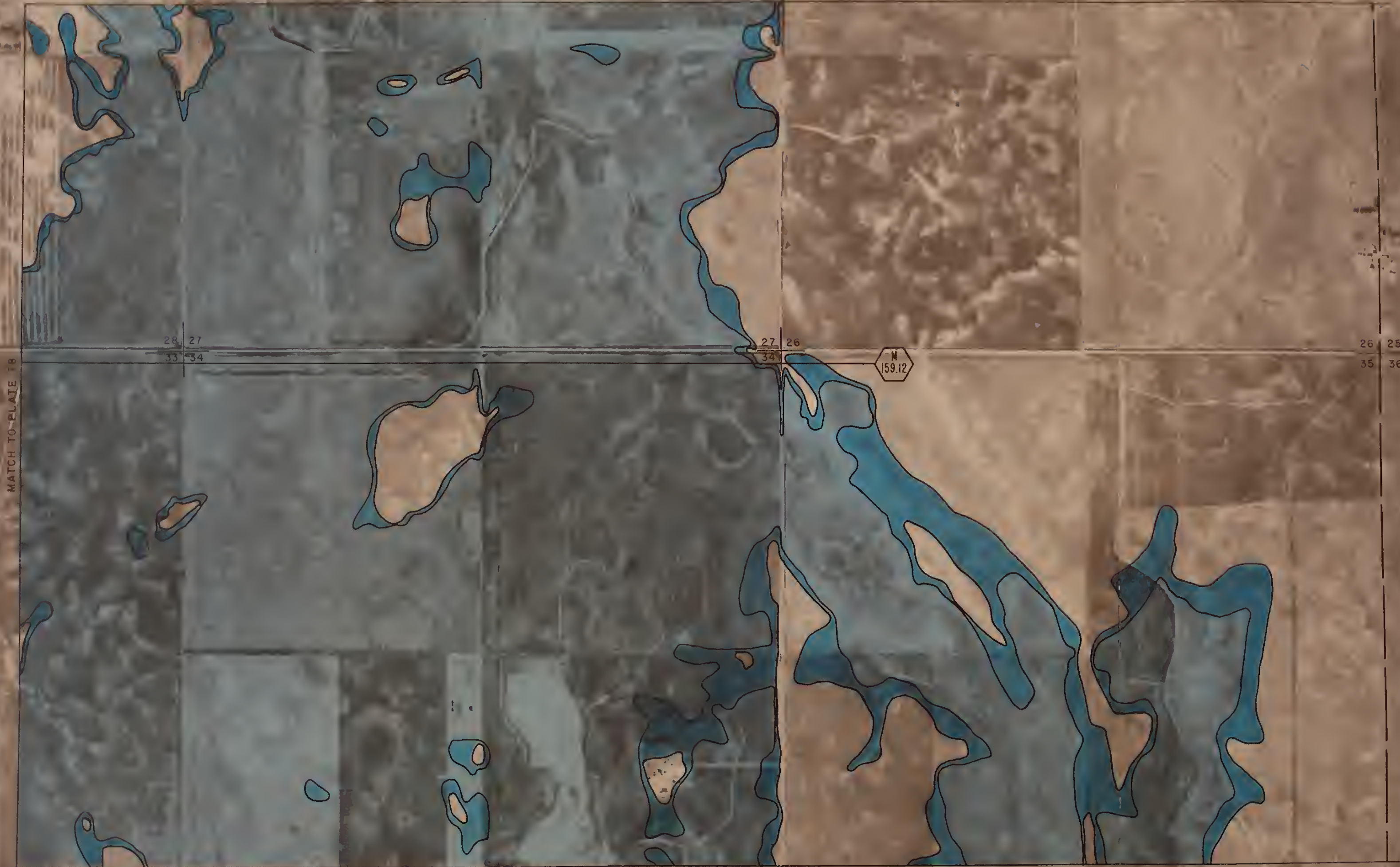


SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KHM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





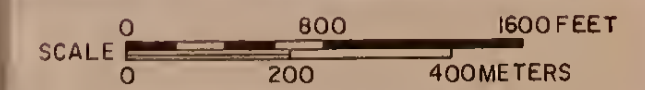
R 55 W  
MATCH TO PLATE 79



**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK X RM B3

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 77 OF 89  
APPENDIX A







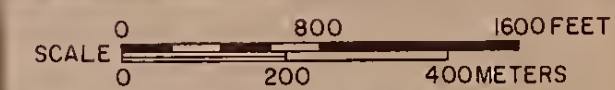
R 55 W  
MATCH TO PLATE 80

T  
142  
N

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 78 OF 89  
APPENDIX A

50 JRC  
MB 978 AERIAL PHOTOS FROM 1971  
ID 151.02 HORIZONTAL SCALE 1:50,000  
INFORMATION FROM 151.02 PERSONNEL

MATCH TO PLATE 76

MATCH TO PLATE 77





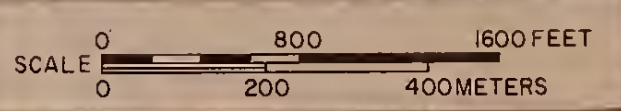




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL





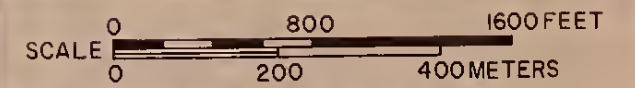




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 80 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, ND FOR CONSTRUCTION CITY  
AND INFORMATION FROM FIELD PERSONNEL







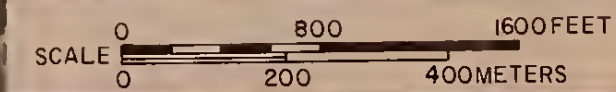
R 55 W

MATCH TO PLATE 83

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

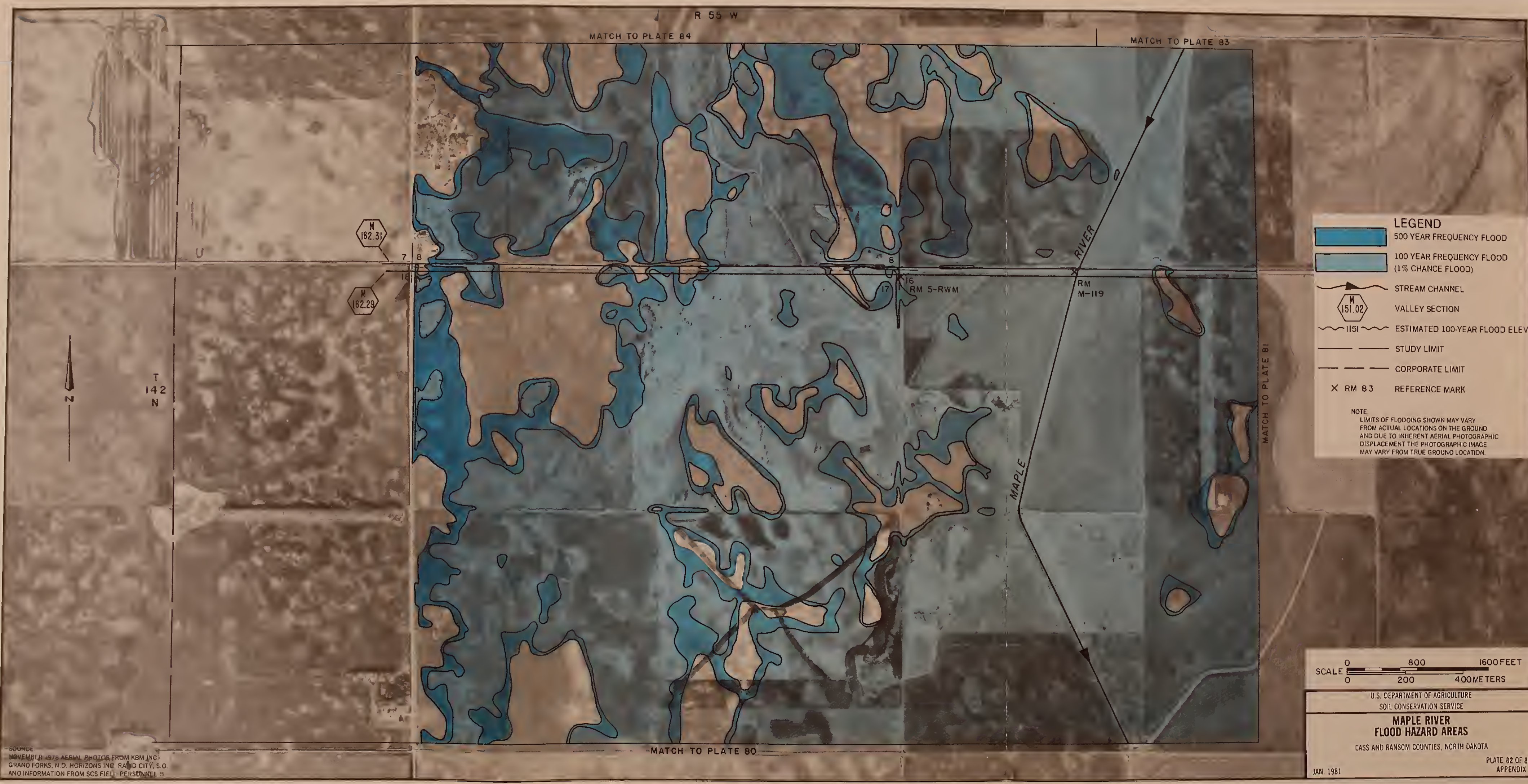
JAN. 1981

PLATE 81 OF 83  
APPENDIX A





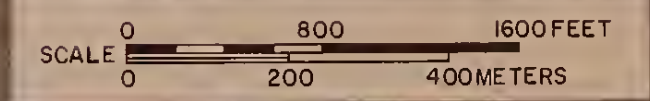




**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- X RM 83 REFERENCE MARK

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

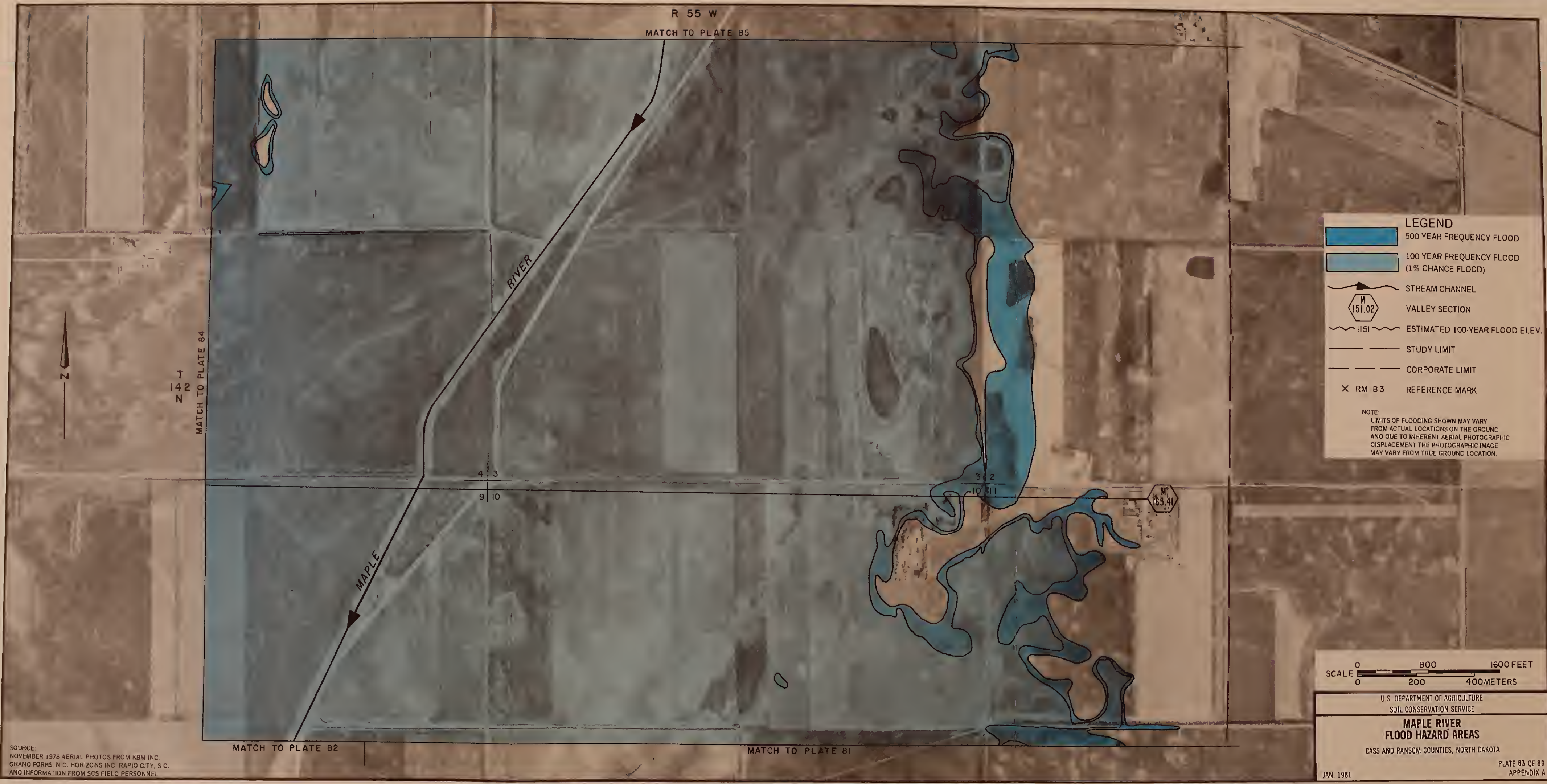
PLATE 82 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1979 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAINO CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL









SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N D. HORIZONS INC. RAPID CITY, S. D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- REFERENCE MARK X RM 83

**NOTE:**  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 83 OF 89  
APPENDIX A





This is an aerial photograph of a coastal region, likely a bay or estuary, with a map overlay. The map features a complex coastline with many inlets and bays. A grid system is overlaid on the map, with numbers 6, 5, 7, 8, 4, and 9 visible. A small inset map in the bottom right corner shows the location of the main map area within a larger context.

2

## MAPLE RIVER FLOOD HAZARD AREAS

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 84 OF 89

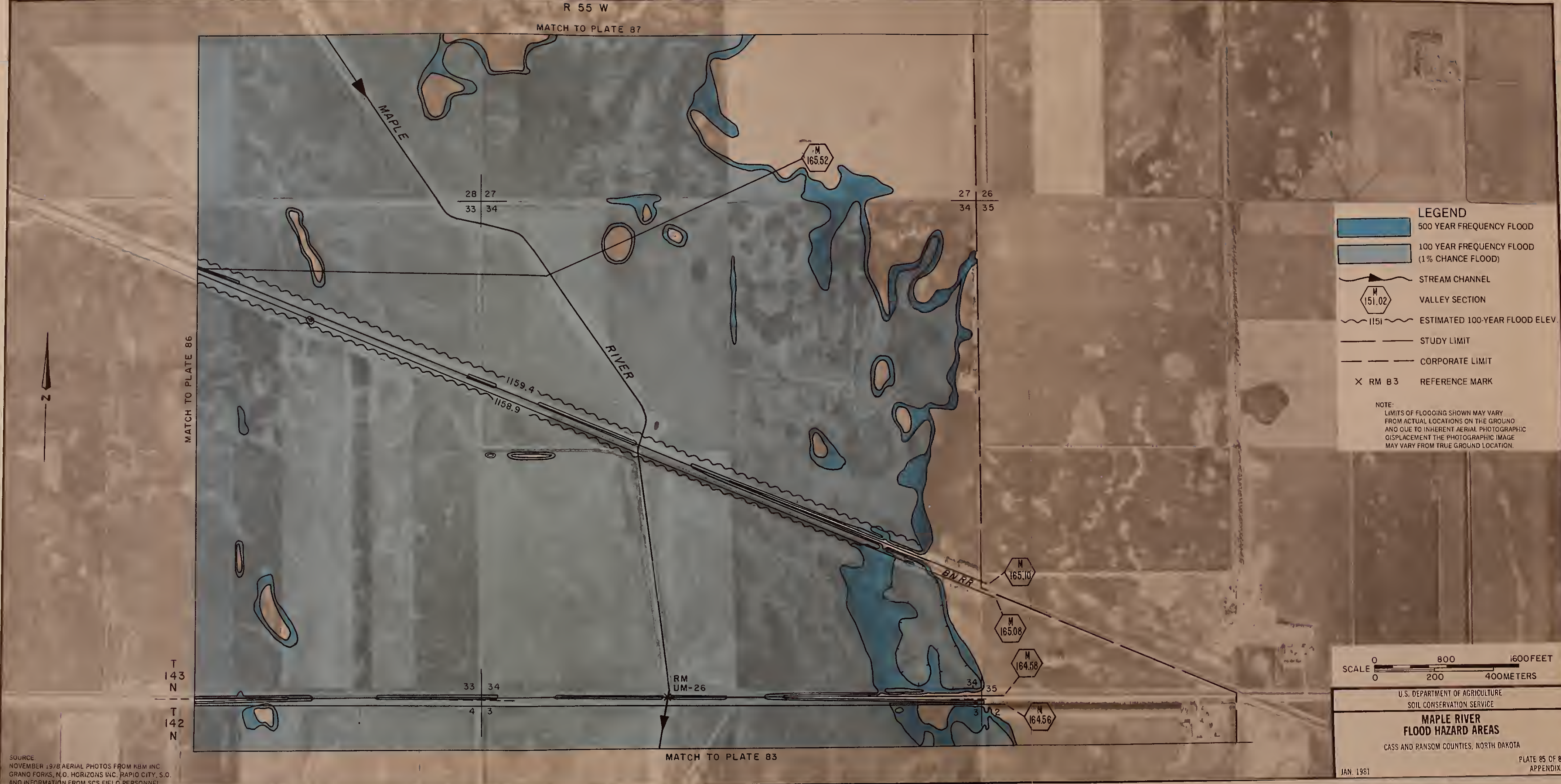
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTO FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL



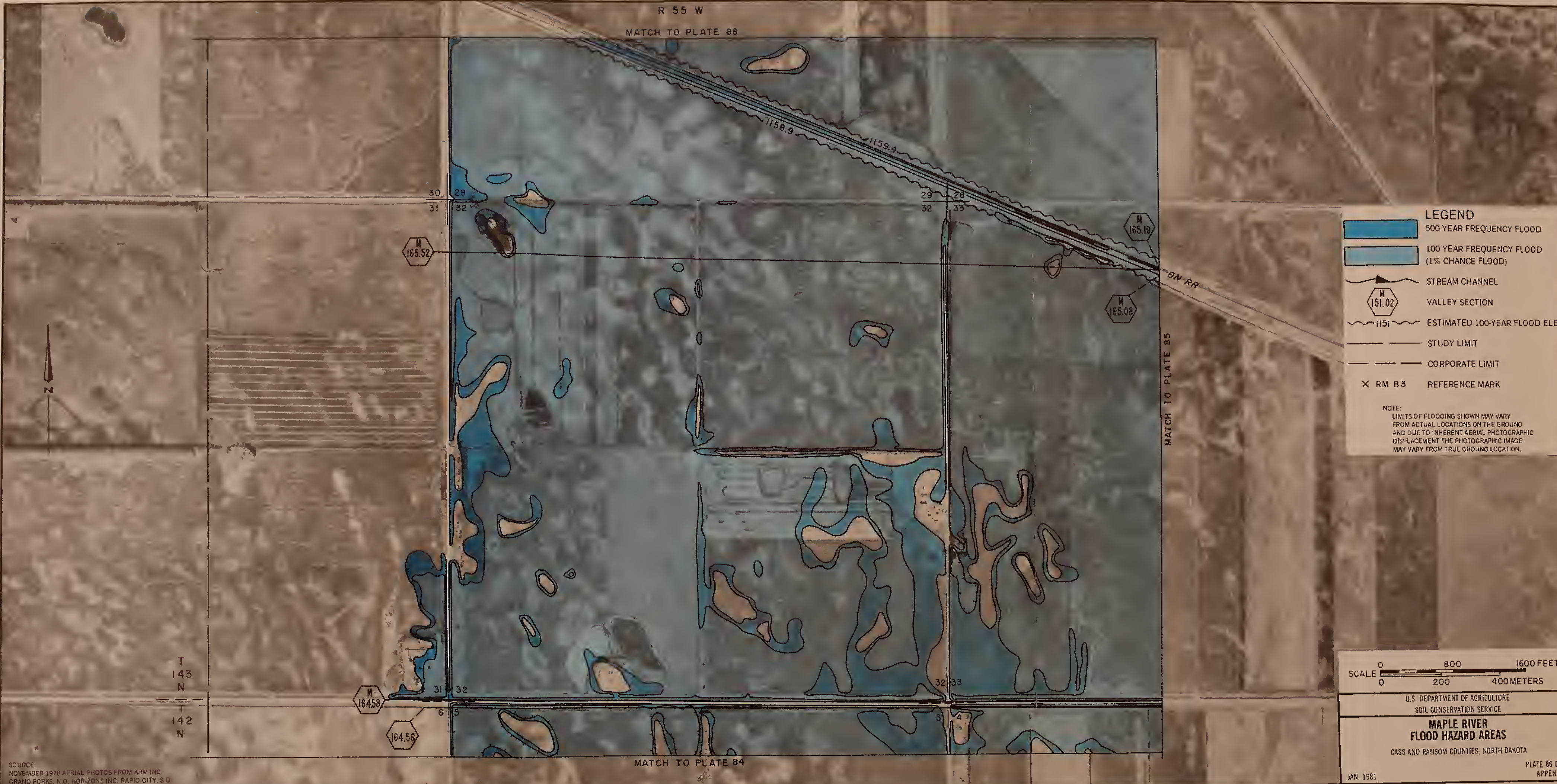












LEGEND

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV. 1151
- STUDY LIMIT
- CORPORATE LIMIT
- X RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

MAPLE RIVER  
FLOOD HAZARD AREAS

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 86 OF 89  
APPENDIX A

SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







R 55 W

MATCH TO PLAT 89

T  
143  
N  
MATCH TO PLATE 88

MATCH TO PLATE 85

- LEGEND**
- 500 YEAR FREQUENCY FLOOD
  - 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
  - STREAM CHANNEL
  - VALLEY SECTION
  - ESTIMATED 100-YEAR FLOOD ELEV.
  - STUDY LIMIT
  - CORPORATE LIMIT
  - REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY  
FROM ACTUAL LOCATIONS ON THE GROUND  
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC  
DISPLACEMENT THE PHOTOGRAPHIC IMAGE  
MAY VARY FROM TRUE GROUND LOCATION.

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

JAN. 1981

PLATE 87 OF 89  
APPENDIX A

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC, RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL







SOURCE:  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC.  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL









**LEGEND**

- 500 YEAR FREQUENCY FLOOD
- 100 YEAR FREQUENCY FLOOD (1% CHANCE FLOOD)
- STREAM CHANNEL
- VALLEY SECTION
- ESTIMATED 100-YEAR FLOOD ELEV.
- STUDY LIMIT
- CORPORATE LIMIT
- × RM B3 REFERENCE MARK

NOTE:  
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.

SOURCE  
NOVEMBER 1978 AERIAL PHOTOS FROM KBM INC  
GRAND FORKS, N.D. HORIZONS INC. RAPID CITY, S.D.  
AND INFORMATION FROM SCS FIELD PERSONNEL

MATCH TO PLATE 87

SCALE 0 800 1600 FEET  
0 200 400 METERS

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**MAPLE RIVER  
FLOOD HAZARD AREAS**

CASS AND RANSOM COUNTIES, NORTH DAKOTA

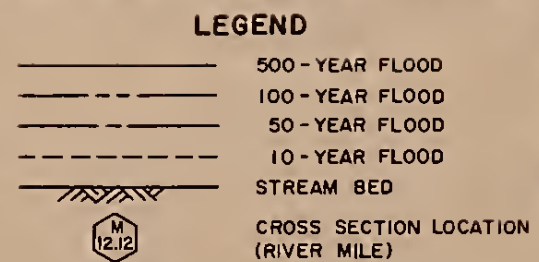
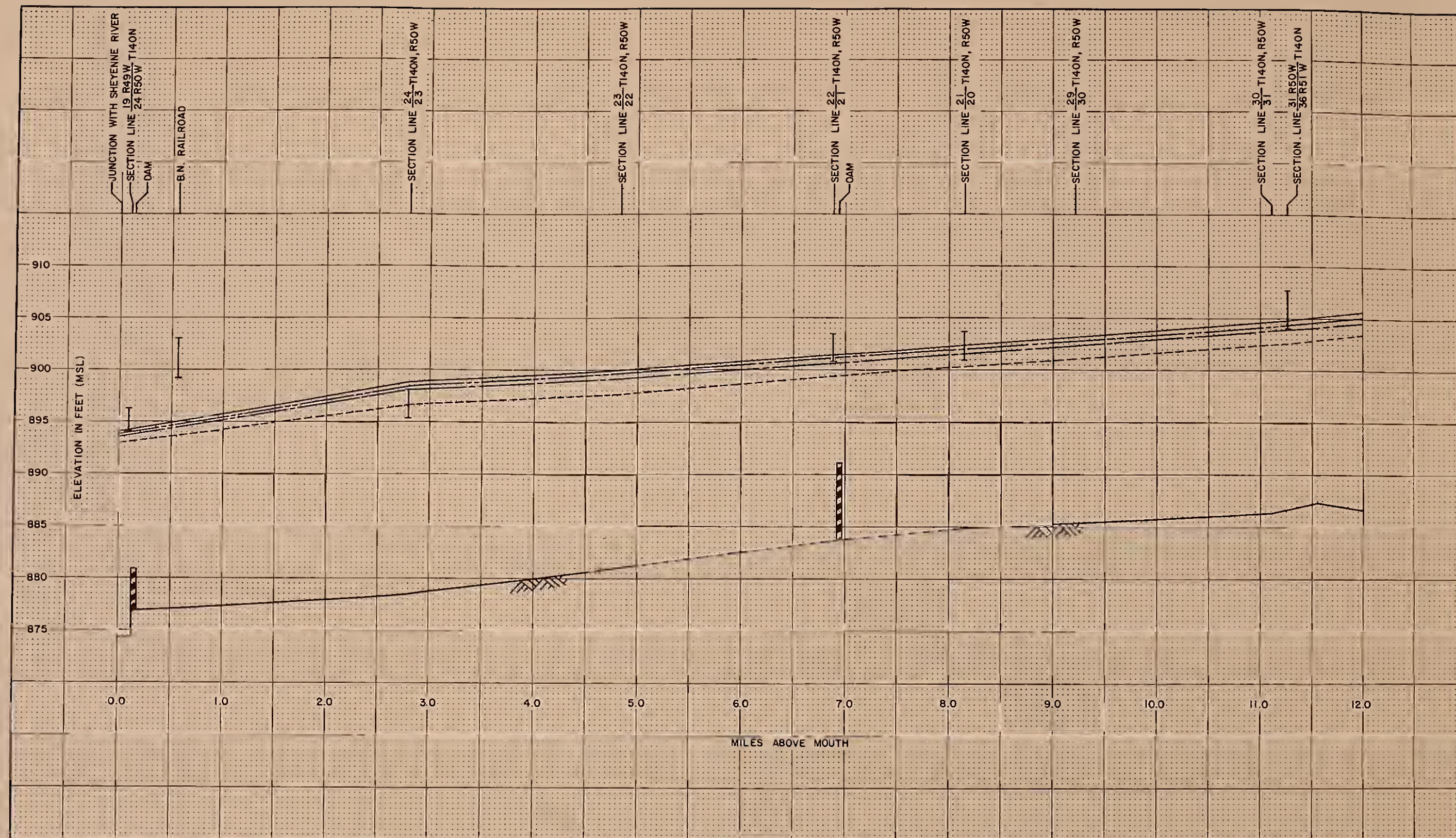
JAN. 1981

PLATE 89 OF 89  
APPENDIX A









NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

**APPENDIX B**

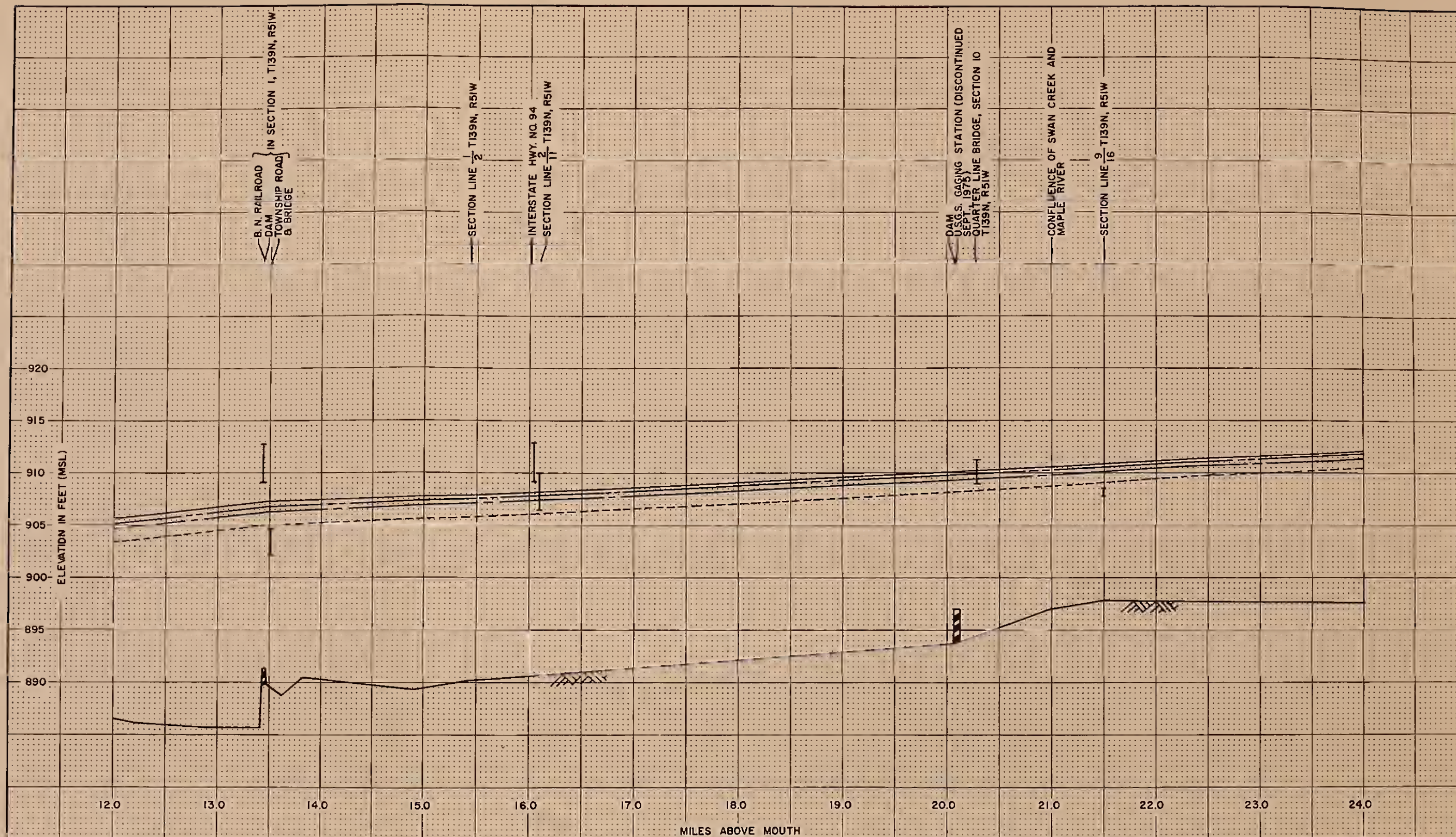
**MAPLE RIVER PROFILES**  
**MAPLE RIVER FLOOD HAZARD ANALYSES**  
 CASS COUNTY NORTH DAKOTA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn, R.D.F.		Title
Traced	Sheet	No. 1 of 15
Checked, J.H.S.	Drawing No.	










**LEGEND**

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- ~~~~~ STREAM BED
-  CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYEN RIVER

**APPENDIX B**

<b>MAPLE RIVER PROFILES</b> <b>MAPLE RIVER FLOOD HAZARD ANALYSES</b> CASS COUNTY NORTH DAKOTA	
<b>U. S. DEPARTMENT OF AGRICULTURE</b> <b>SOIL CONSERVATION SERVICE</b>	
Designed _____ Drawn <u>R.D.F.</u> Traced _____ Checked <u>J.H.S.</u>	Date _____ Approved by _____ Title _____ Sheet <u>2</u> of <u>15</u> Drawing No. _____





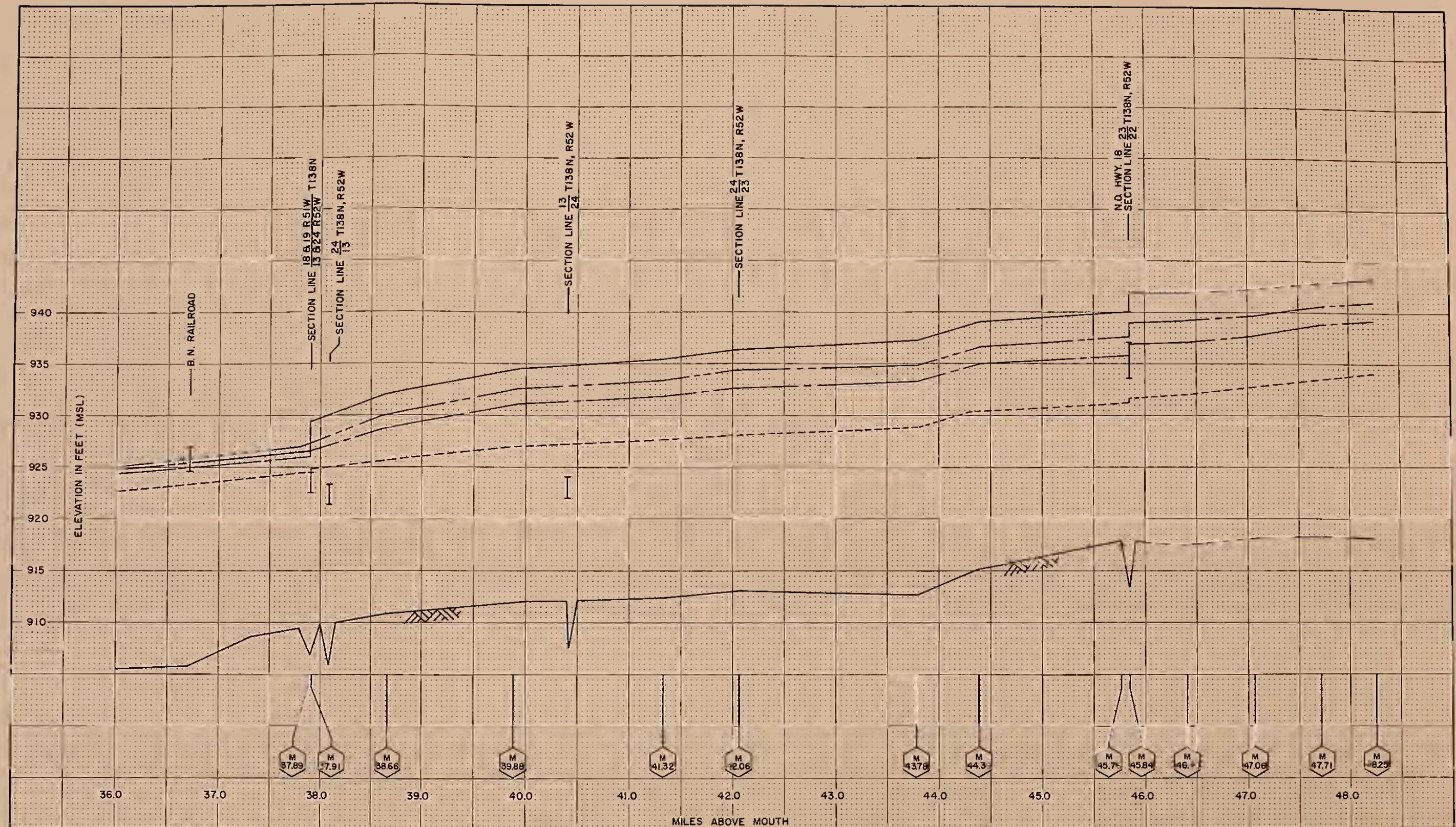












# LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 50-YEAR FLOOD
- 10-YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

## APPENDIX B

MAPLE RIVER PROFILES  
 MAPLE RIVER FLOOD HAZARD ANALYSES  
 CASS COUNTY NORTH DAKOTA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn R.D.F.		Title
Traced	Sheet	Drawing No.
Checked J.H.S.	No 4 of 15	









# LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 50-YEAR FLOOD
- 10-YEAR FLOOD
- STREAM 8EO
- CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

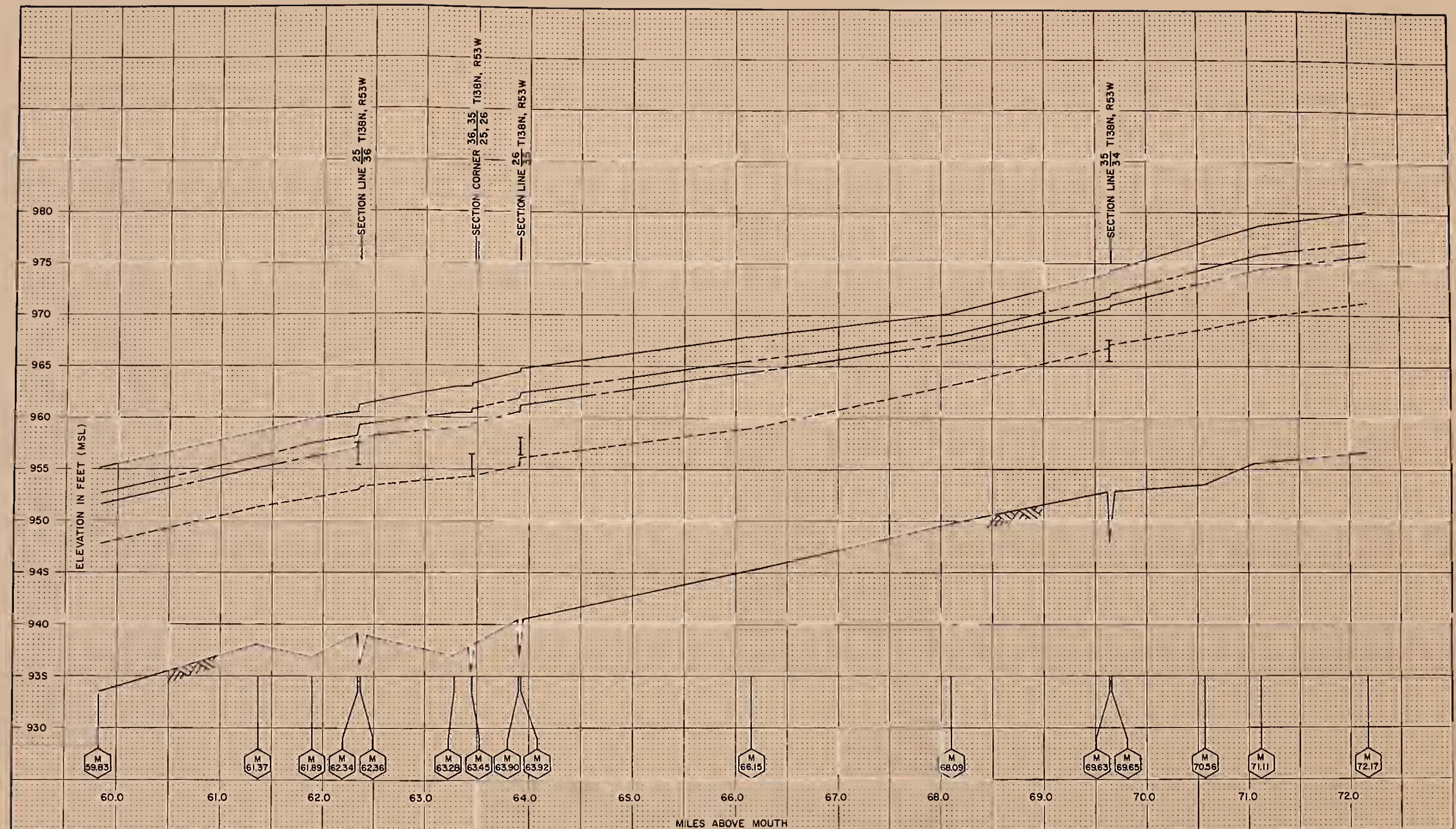
## APPENDIX B

<p>MAPLE RIVER PROFILES</p> <p>MAPLE RIVER FLOOD HAZARD ANALYSES</p> <p>CASS COUNTY NORTH DAKOTA</p> <p>U. S. DEPARTMENT OF AGRICULTURE</p> <p>SOIL CONSERVATION SERVICE</p>	
<p>Designed: R.D.F.</p> <p>Drawn: R.D.F.</p> <p>Traced: J.H.S.</p> <p>Checked: J.H.S.</p>	<p>Date: _____</p> <p>Approved by: _____</p> <p>Title: _____</p> <p>Sheet: _____</p> <p>Drawing No: _____</p> <p>No. 5 of 15</p>









### LEGEND

	500-YEAR FLOOD
	100-YEAR FLOOD
	50-YEAR FLOOD
	10-YEAR FLOOD
	STREAM BED
	CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

### APPENDIX B

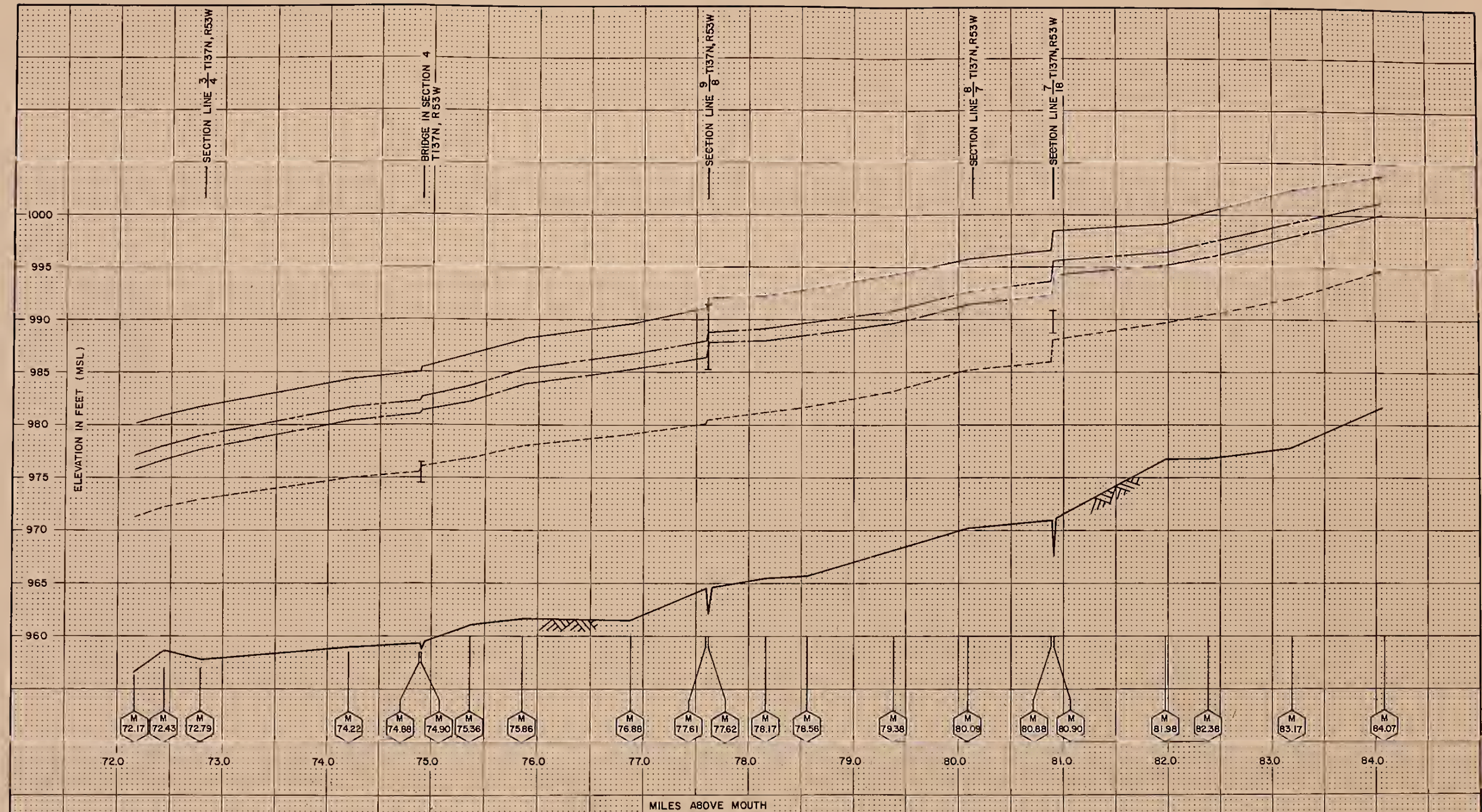
**MAPLE RIVER PROFILES**  
**MAPLE RIVER FLOOD HAZARD ANALYSES**  
 CASS COUNTY NORTH DAKOTA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn R.D.F.		
Traced	Title	Drawing No.
Checked J.H.S.	Sheet No. 6 of 15	









# LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 50-YEAR FLOOD
- 10-YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

## APPENDIX B

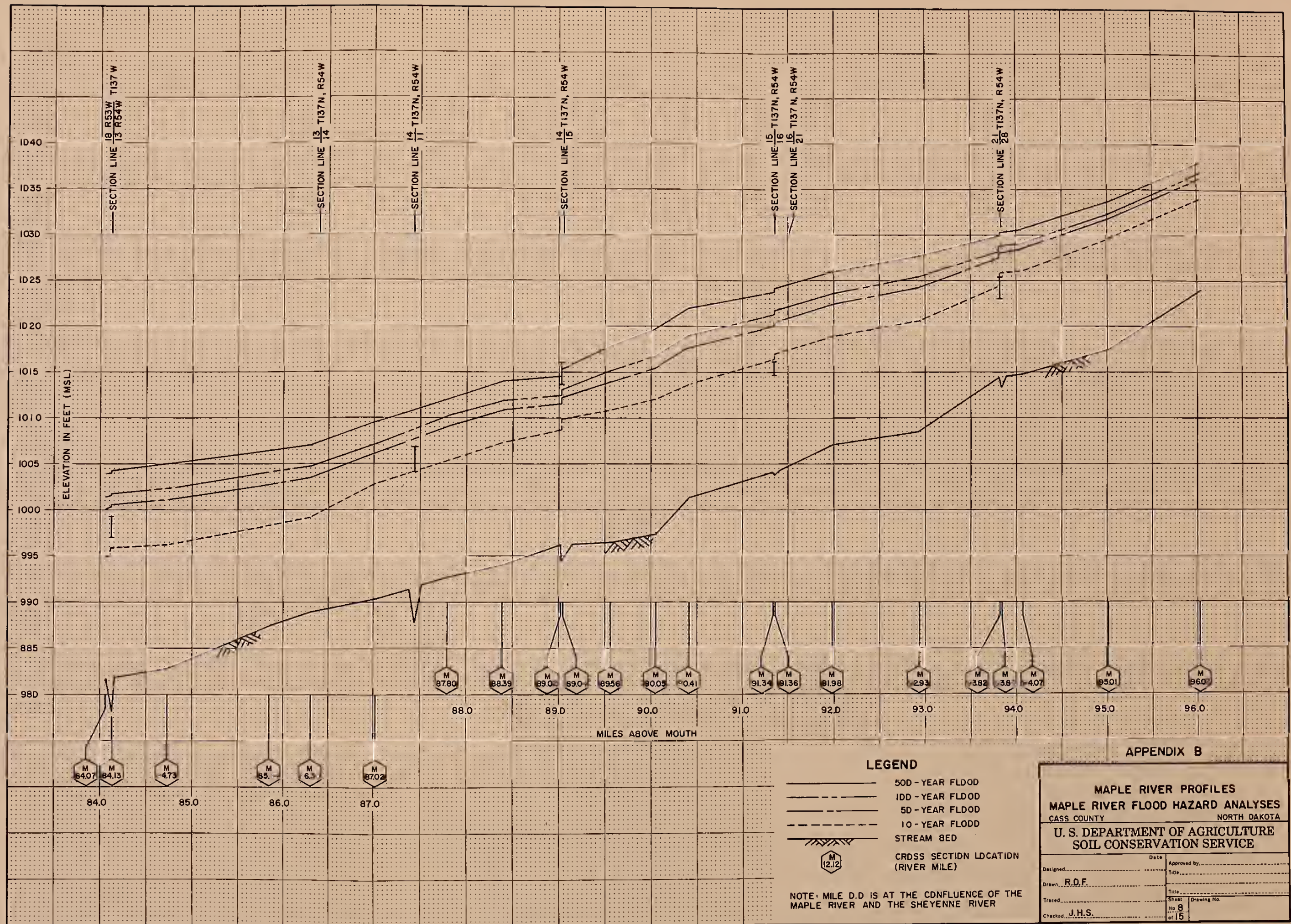
**MAPLE RIVER PROFILES**  
**MAPLE RIVER FLOOD HAZARD ANALYSES**  
 CASS COUNTY NORTH DAKOTA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn R.O.F.		
Traced	Title	
Checked J.H.S.	Sheet No. 7 of 15	Drawing No.





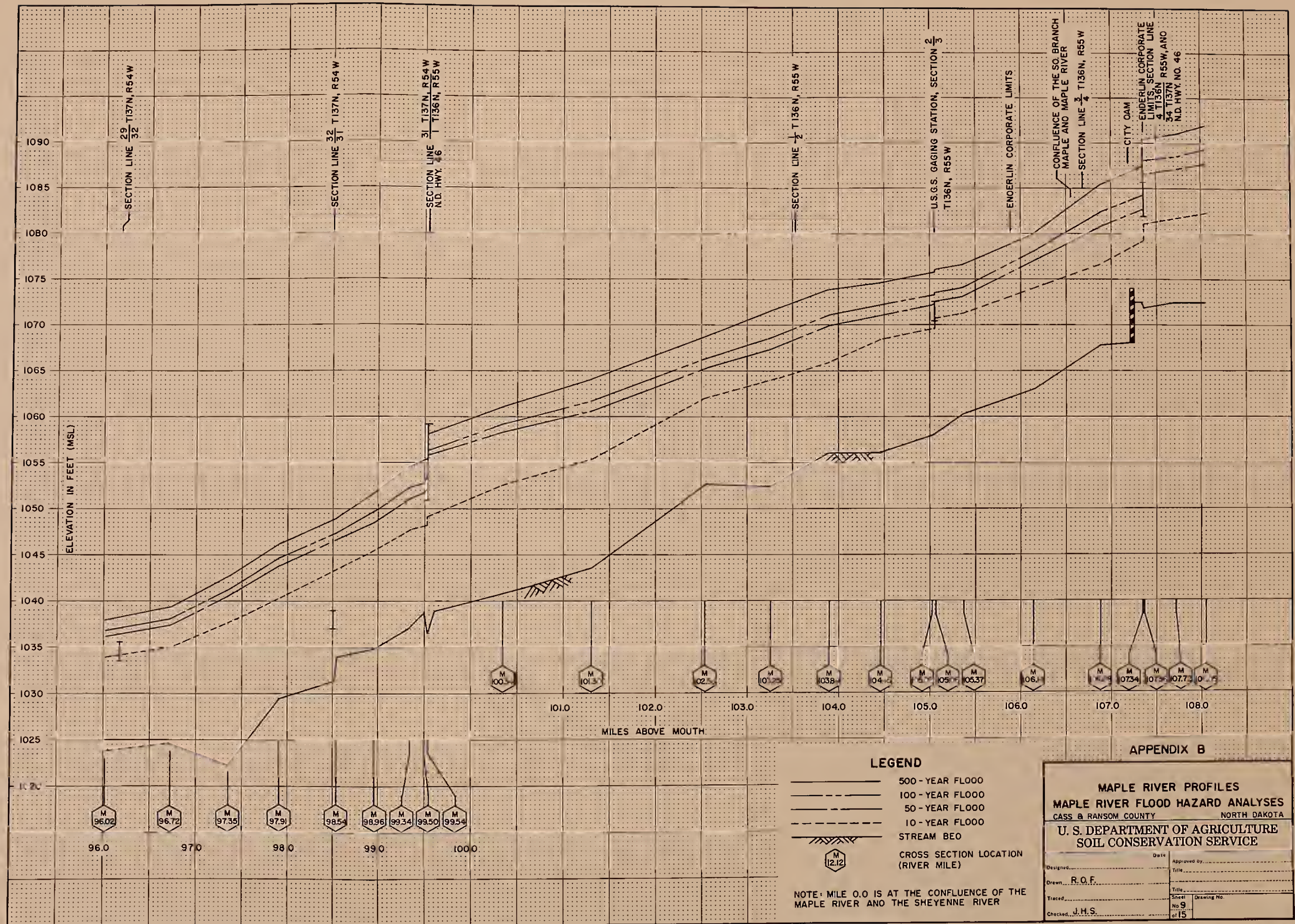








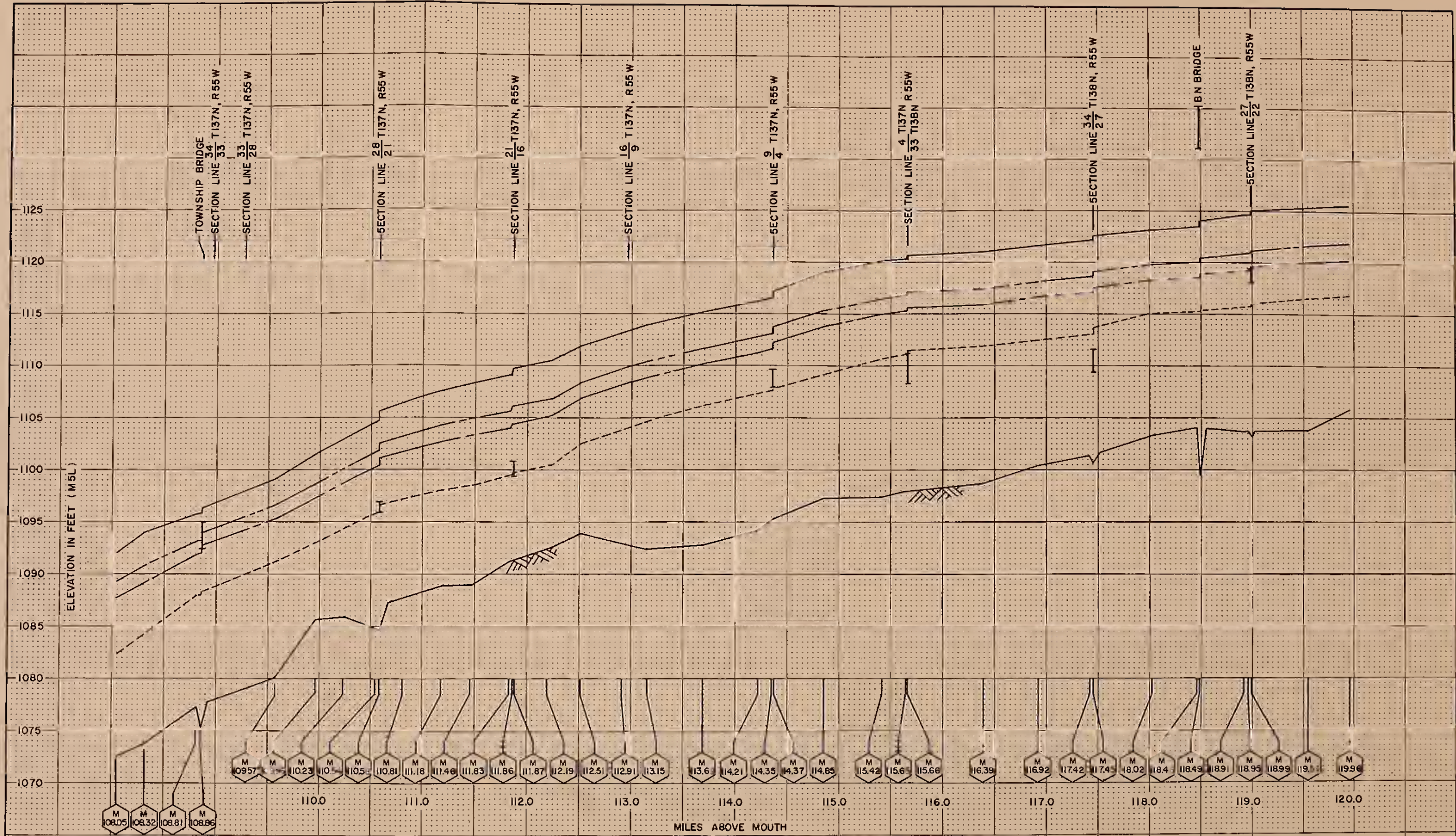












**LEGEND**

- 500-YEAR FLOOD
- - - - - 100-YEAR FLOOD
- · - · - 50-YEAR FLOOD
- · · · · 10-YEAR FLOOD
- ||||| STREAM BED
- M CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

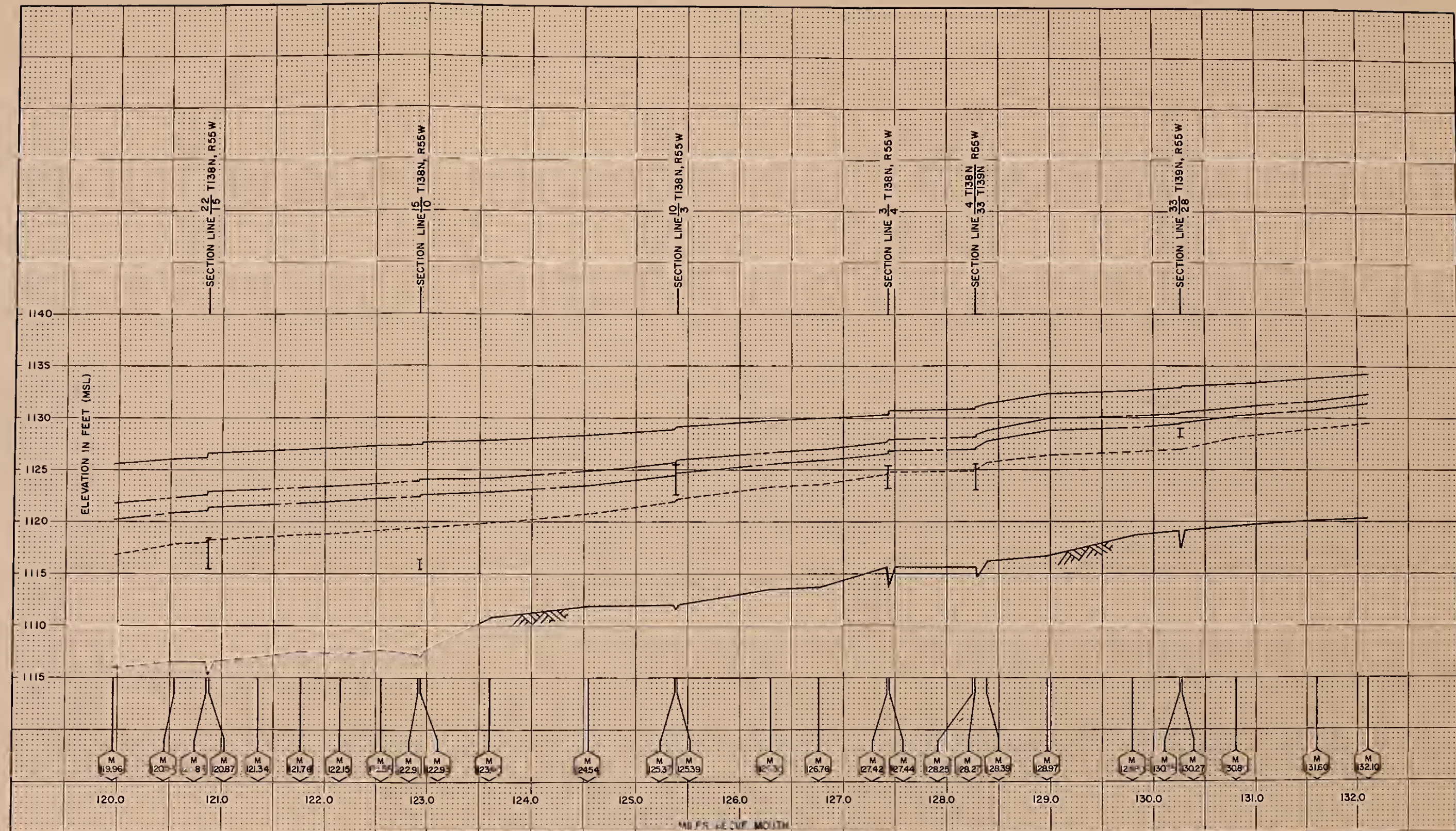
**APPENDIX B**

<b>MAPLE RIVER PROFILES</b> <b>MAPLE RIVER FLOOD HAZARD ANALYSES</b> CASS COUNTY NORTH DAKOTA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed by _____ Drawn R.D.F. _____ Traced _____ Checked J.H.S. _____	Date _____ Approved by _____ Title _____ Sheet No. 10 of 15 Drawing No. _____









# LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 50-YEAR FLOOD
- 10-YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

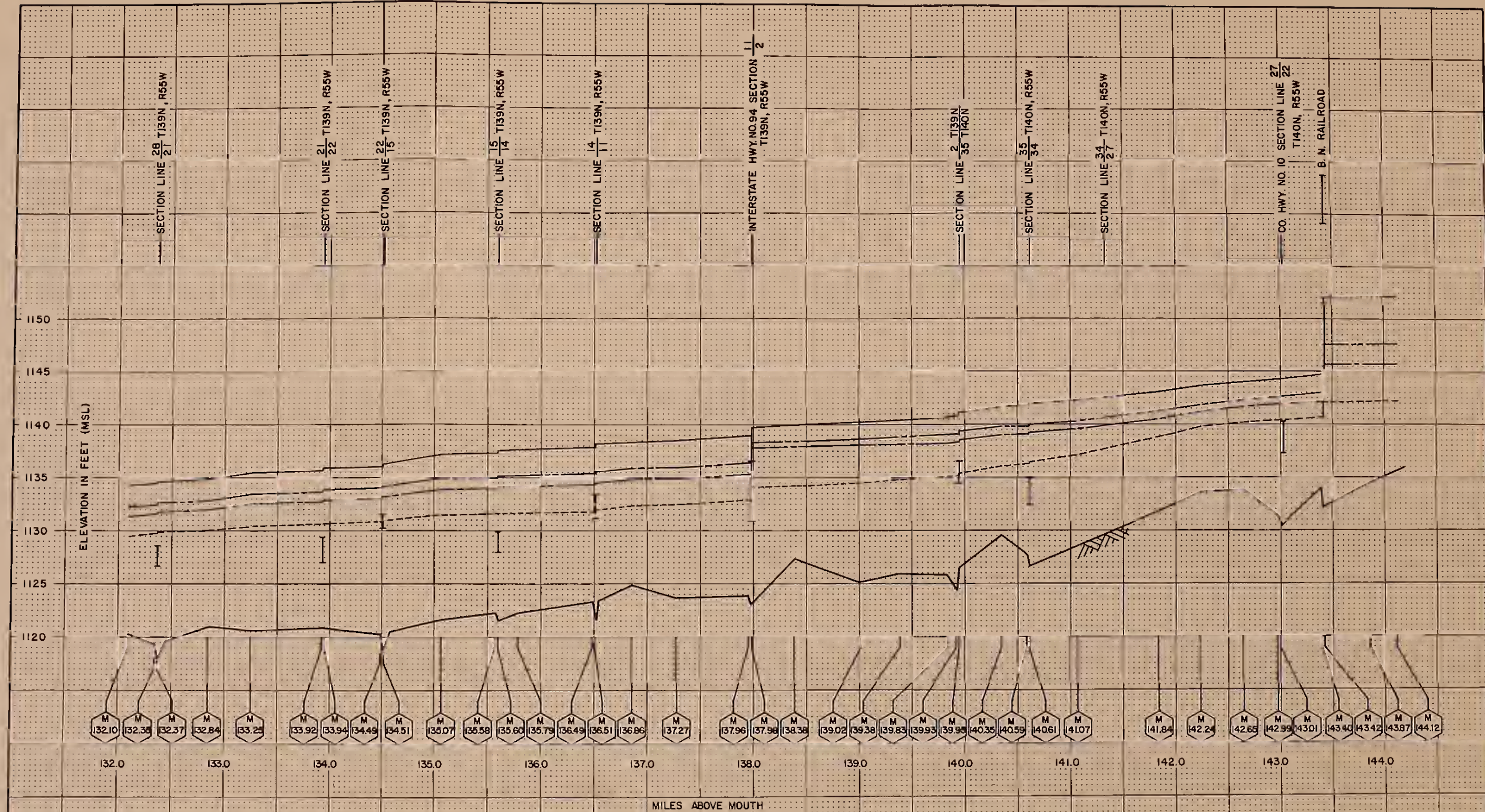
## APPENDIX B

<p>MAPLE RIVER PROFILES</p> <p>MAPLE RIVER FLOOD HAZARD ANALYSES</p> <p>CASS COUNTY NORTH DAKOTA</p> <p>U. S. DEPARTMENT OF AGRICULTURE</p> <p>SOIL CONSERVATION SERVICE</p>	
<p>Designed _____</p> <p>Drawn <u>R.D.F.</u></p> <p>Traced _____</p> <p>Checked <u>J.H.S.</u></p>	<p>Date _____</p> <p>Approved by _____</p> <p>Title _____</p> <p>Sheet <u>2-80</u></p> <p>Drawing No. _____</p> <p>No. <u>11</u> of <u>15</u></p>









# LEGEND

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

## APPENDIX B

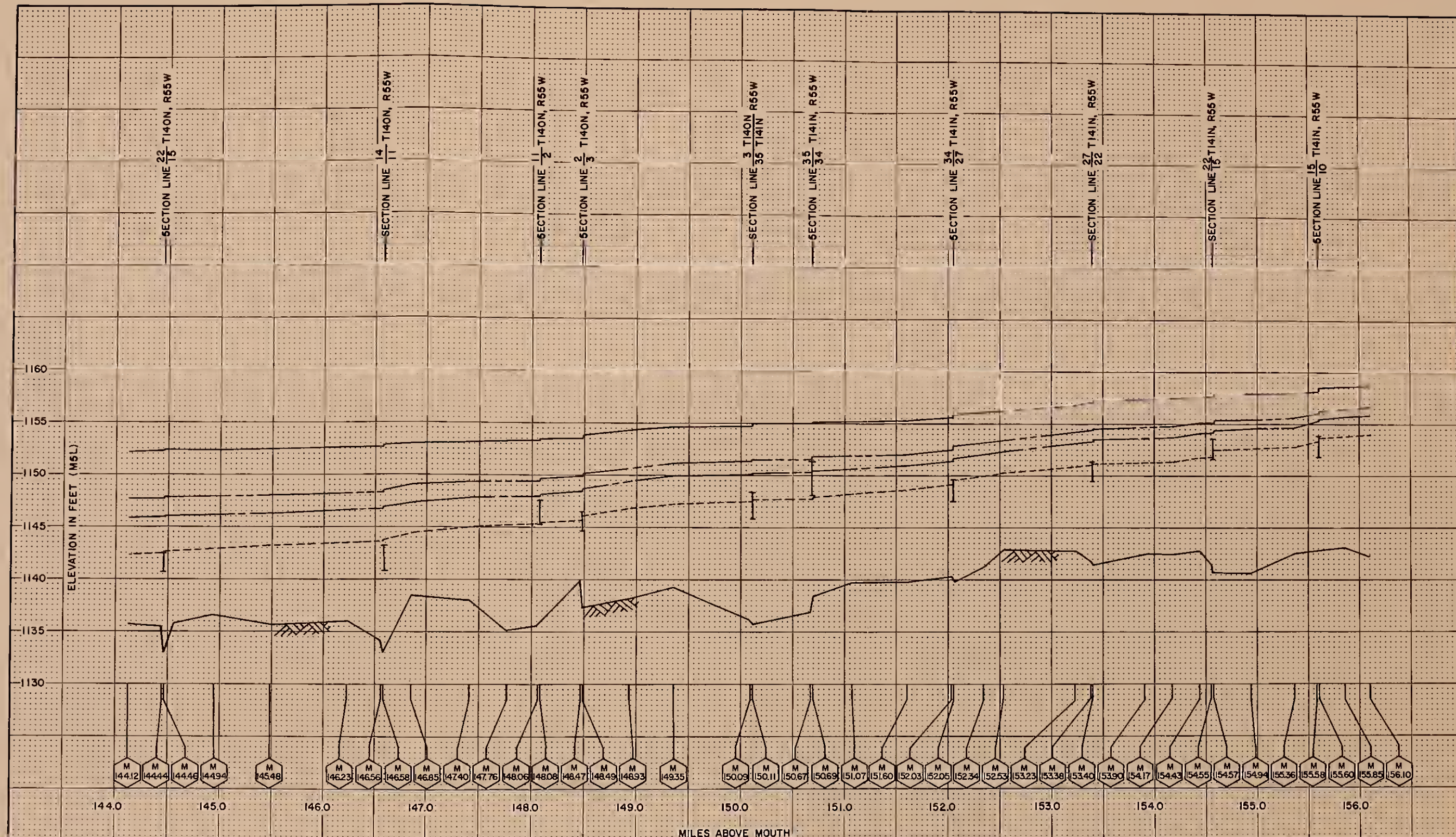
MAPLE RIVER PROFILES  
MAPLE RIVER FLOOD HAZARD ANALYSES  
CASS COUNTY NORTH DAKOTA  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn R.D.F.	2-80	Title
Traced	Sheet No. 12	Drawing No.
Checked J.H.S.	of 15	









**LEGEND**

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

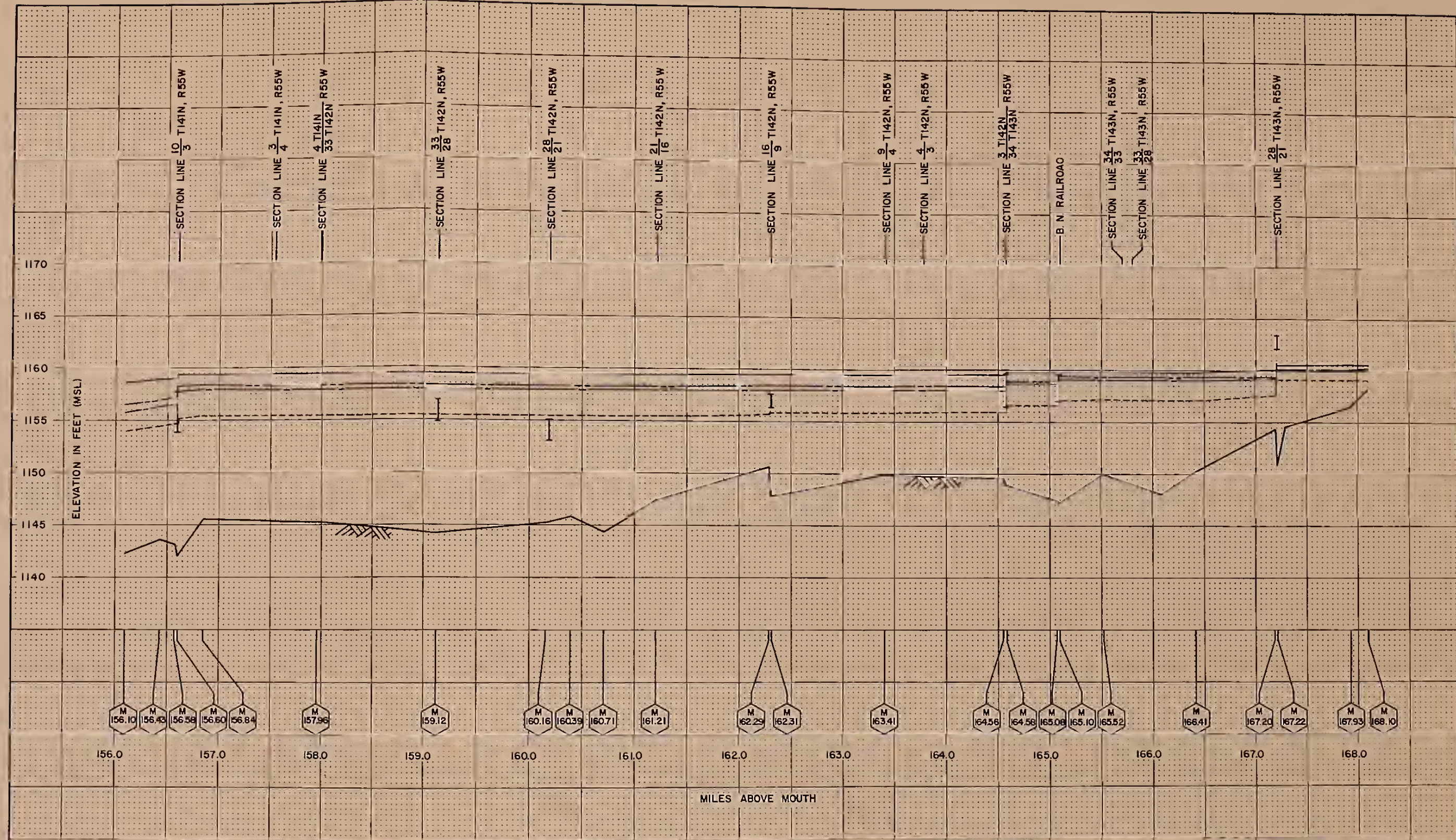
**APPENDIX B**

<b>MAPLE RIVER PROFILES</b> <b>MAPLE RIVER FLOOD HAZARD ANALYSES</b> CASS COUNTY NORTH DAKOTA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Date _____ Designed _____ Drawn <u>R.O.F.</u> Traced _____ Checked <u>J.H.S.</u>	Approved by _____ Title _____ Date <u>2-90</u> Sheet <u>13</u> of <u>15</u> Drawing No. _____









# APPENDIX B

## LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 50-YEAR FLOOD
- 10-YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (RIVER MILE)

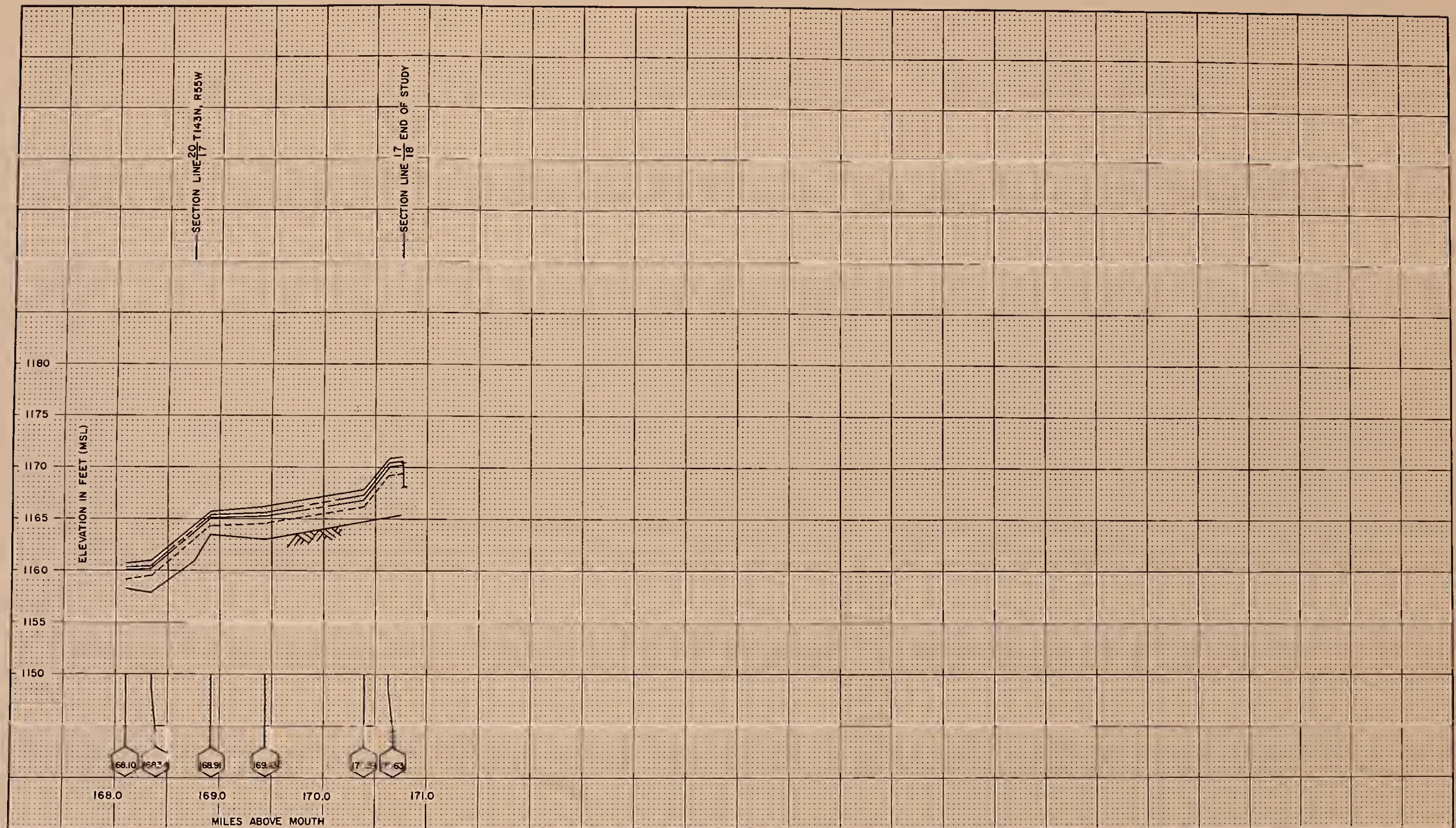
NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE MAPLE RIVER AND THE SHEYENNE RIVER

<b>MAPLE RIVER PROFILES</b> <b>MAPLE RIVER FLOOD HAZARD ANALYSES</b> CASS COUNTY NORTH DAKOTA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed by _____ Drawn by <b>R.O.F.</b> Traced by _____ Checked by <b>J.H.S.</b>	Date _____ Approved by _____ Title _____ Sheet No. <b>14</b> Drawing No. _____ of <b>15</b>









68.10

6834

168.91

169.43

1739

63

### LEGEND

500 - YEAR FLOOD

100 - YEAR FLOOD

50 - YEAR FLOOD

10 - YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION  
(RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE  
MAPLE RIVER AND THE SHEYENNE RIVER

## APPENDIX B

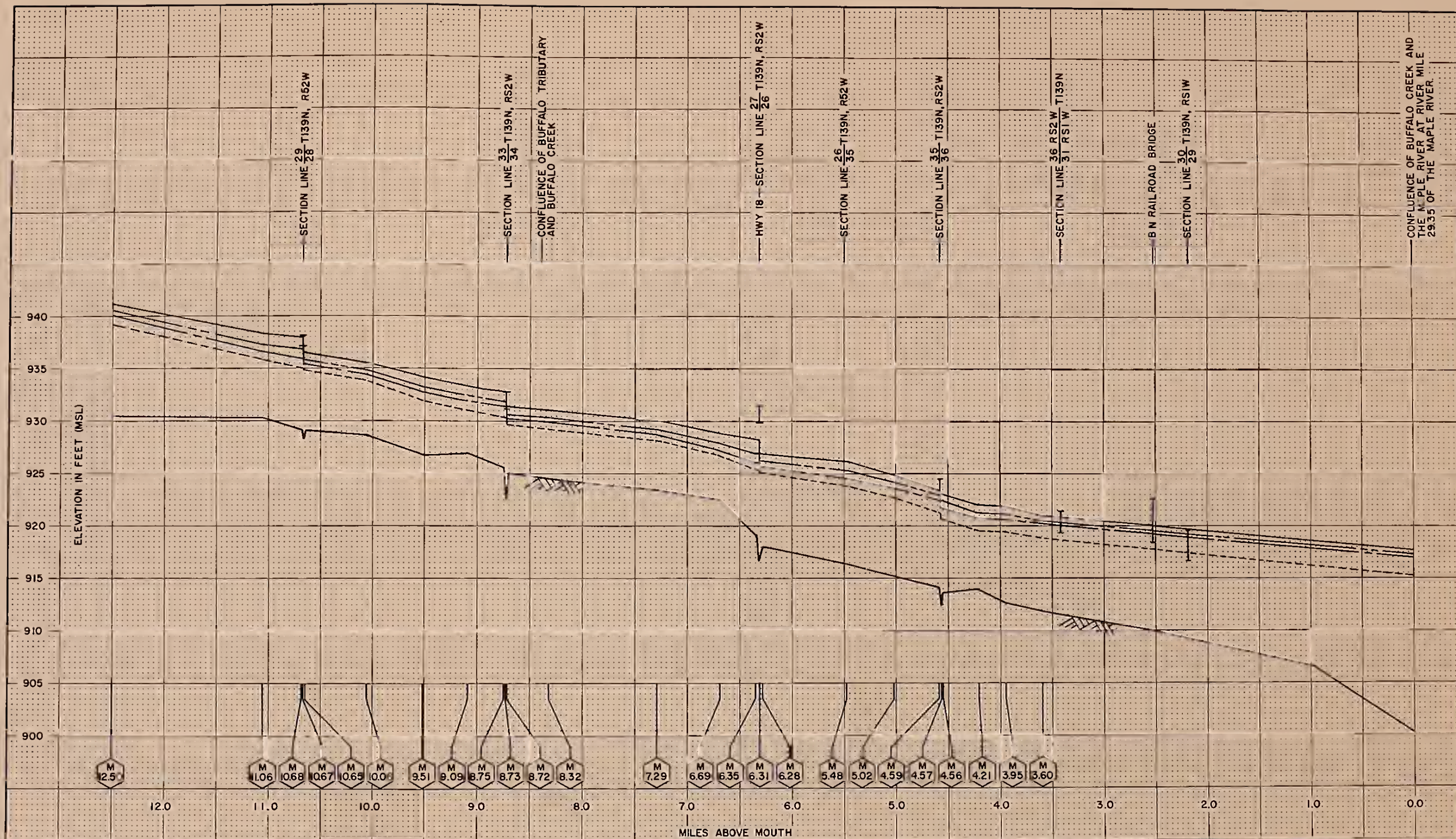
**MAPLE RIVER PROFILES**  
**MAPLE RIVER FLOOD HAZARD ANALYSES**  
**CASS COUNTY** **NORTH DAKOTA**  
**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

Designed _____	Date _____	Approved by _____
Drawn <u>R.D.F.</u>	<u>4-80</u>	Title _____
Traced _____	Sheet _____	Drawing No. _____
Checked <u>J.H.S.</u>	No. <u>15</u> of <u>15</u>	









# **LEGEND**

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE BUFFALO CREEK AND THE MAPLE RIVER.

## **APPENDIX B**

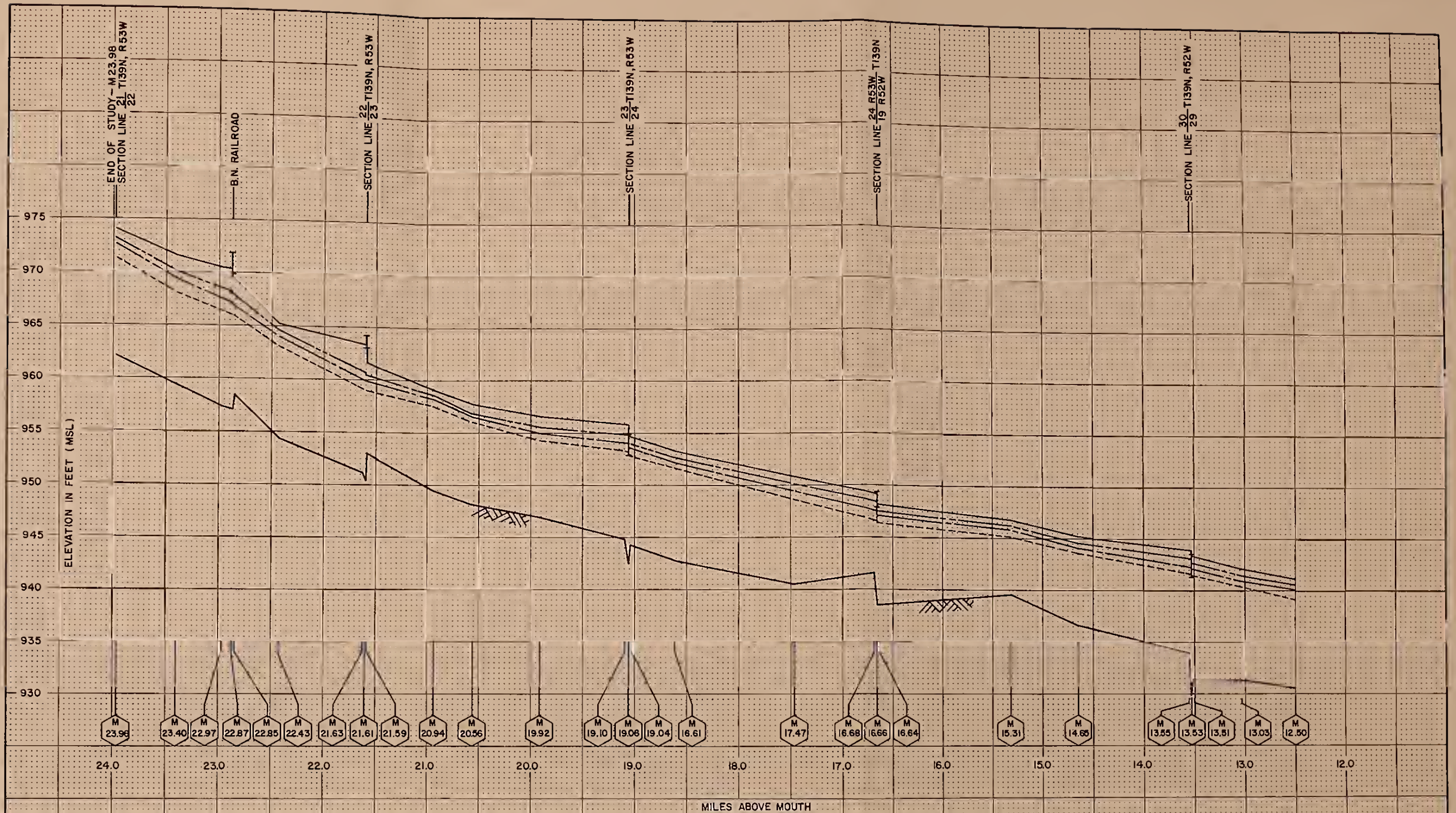
**BUFFALO CREEK PROFILES**  
**MAPLE RIVER FLOOD HAZARD ANALYSES**  
 CASS COUNTY NORTH DAKOTA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn: R.D.F.	12-79	
Traced	Sheet	Drawing No.
Checked: J.H.S.	No 1	
	of 2	










# LEGEND

- 500 - YEAR FLOOD
- - - - - 100 - YEAR FLOOD
- · - · - 50 - YEAR FLOOD
- · - · - 10 - YEAR FLOOD
- x——— STREAM BED
-  CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF BUFFALO CREEK AND THE MAPLE RIVER

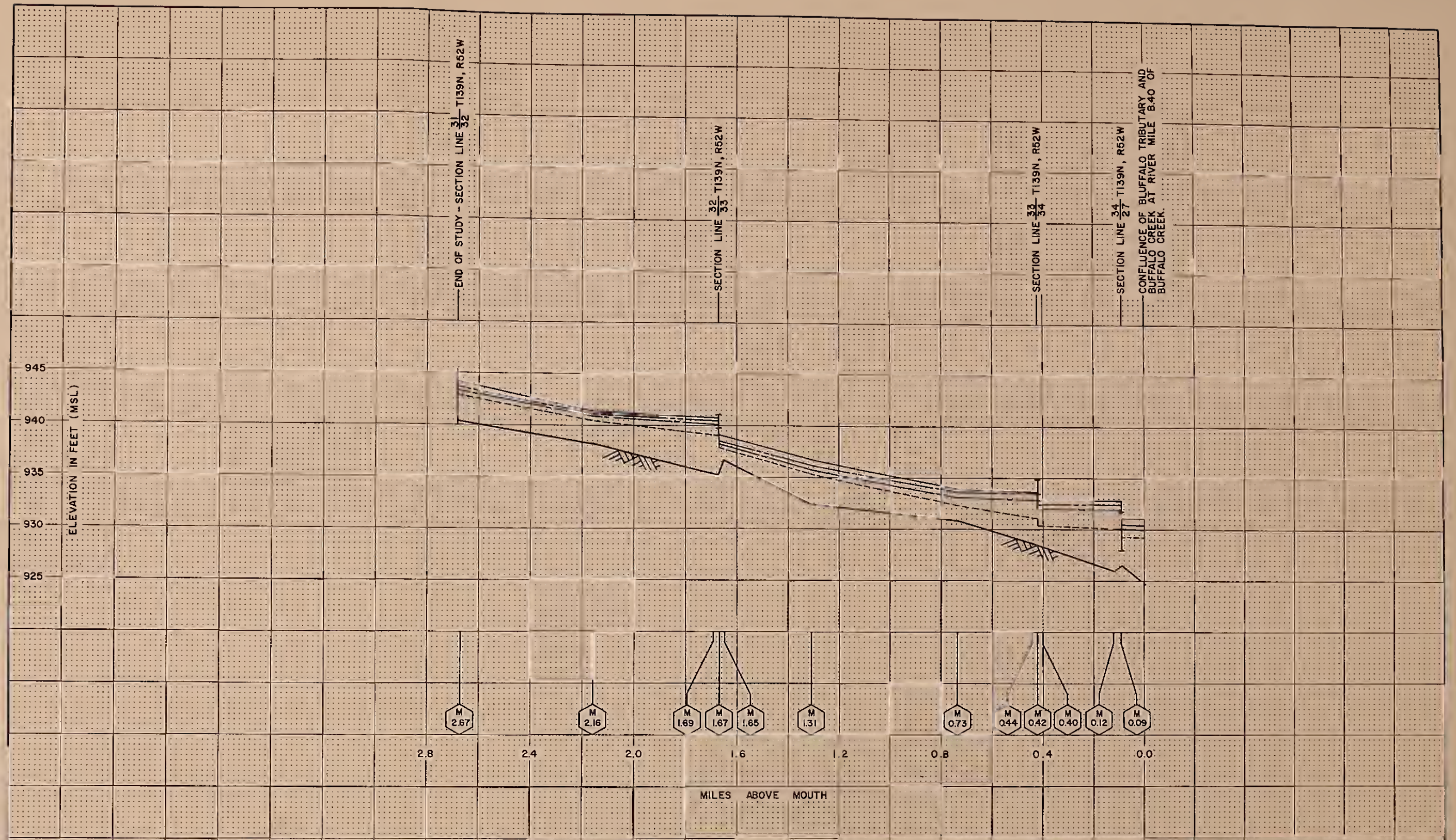
## APPENDIX B

<b>BUFFALO CREEK PROFILES</b> <b>MAPLE RIVER FLOOD HAZARD ANALYSES</b> CASS COUNTY NORTH DAKOTA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed _____	Date _____
Drawn <u>R.D.F.</u>	Approved by _____
Traced _____	Title _____
Checked <u>J.H.S.</u>	Sheet <u>2</u> of <u>2</u>
	Drawing No. _____









# APPENDIX B

## LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 50-YEAR FLOOD
- 10-YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF THE BUFFALO TRIBUTARY AND BUFFALO CREEK.

<b>BUFFALO TRIBUTARY PROFILES</b> <b>MAPLE RIVER FLOOD HAZARD ANALYSES</b> CASS COUNTY NORTH DAKOTA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Date _____ Designed _____ Drawn <b>R.D.F.</b> Traced _____ Checked <b>J.H.S.</b>	Approved by _____ Title _____ <b>5-B0</b> Drawing No. _____ Sheet _____ No. _____ of _____







ELEVATION IN FEET (MSL)

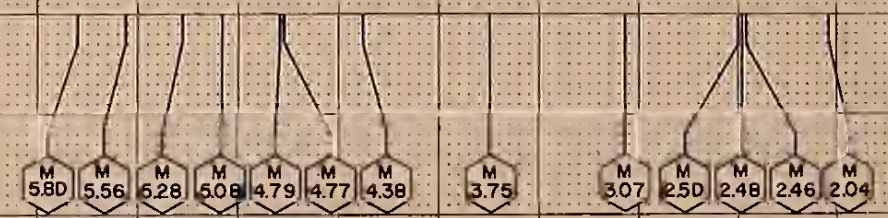
END OF STUDY - BRIDGE IN SECTION 1, T139N, R52W

BRIDGE BETWEEN SECTIONS 5 & 6, T139N, R51W

CENTERLINE OF INTERSTATE HWY 94  
SECTION LINE BRIDGE BETWEEN SECTIONS 4 & 9  
T139N, R51W

COMMON FLOODPLAIN OF SWAN CREEK AND  
THE MAPLE RIVER

BRIDGE IN SECTION 9, T139N, R51W  
CONFLUENCE OF SWAN CREEK AND THE  
MAPLE RIVER



6.0 5.0 4.0 3.0 2.0 1.0 0.0

MILES ABOVE MOUTH

LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 50-YEAR FLOOD
- 10-YEAR FLOOD
- STREAM BED
- CRDSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF SWAN CREEK AND THE MAPLE RIVER.

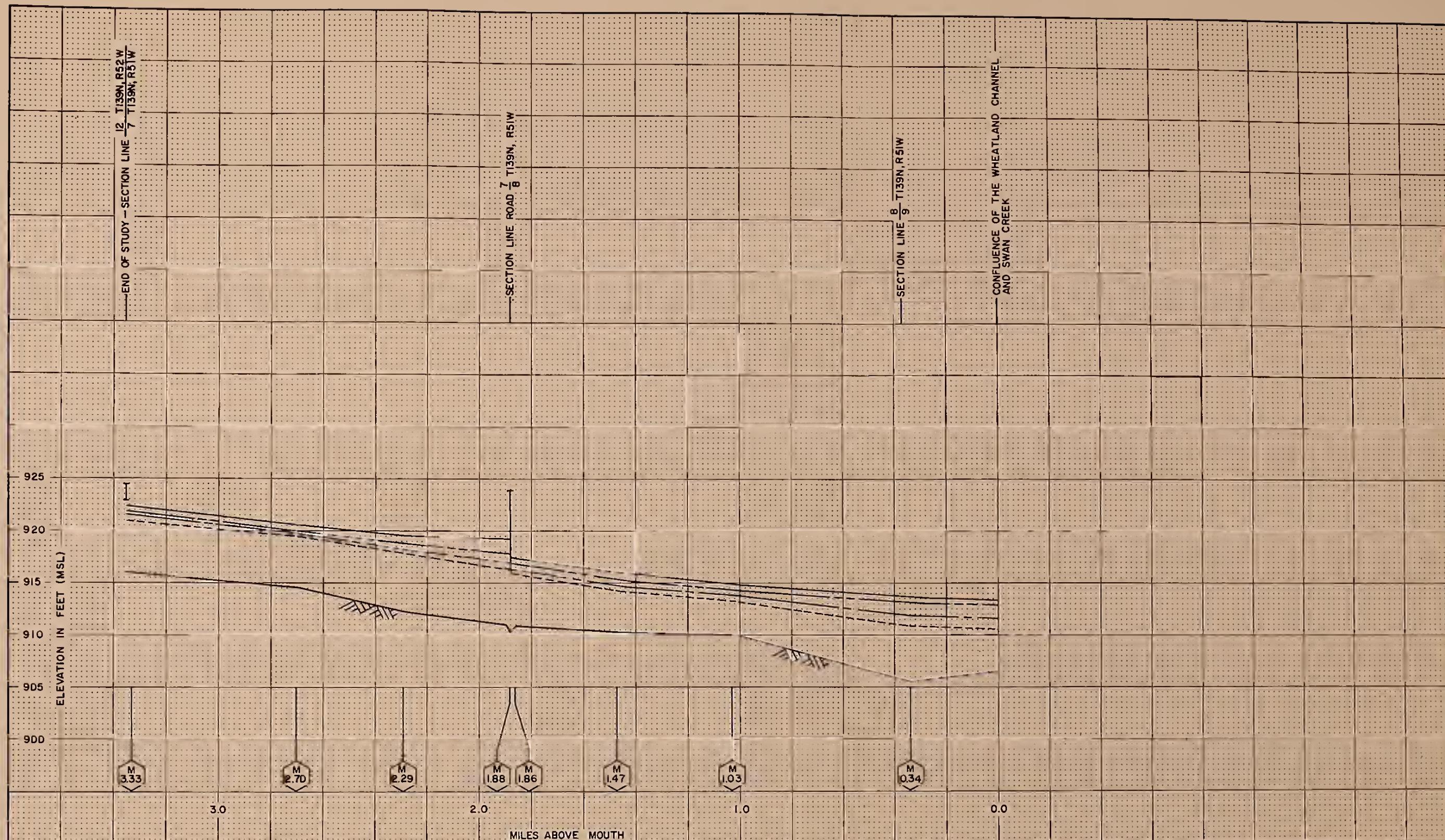
APPENDIX B

SWAN CREEK PROFILES			
MAPLE RIVER FLOOD HAZARD ANALYSES			
CASS COUNTY		NORTH DAKOTA	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed	R.D.F.	Date	12-79
Drawn		Sheet	No. 1
Traced		of	
Checked	J.H.S.		










# LEGEND

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- - - - 50 - YEAR FLOOD
- . - . 10 - YEAR FLOOD
- ~~~~~ STREAM BED
-  CROSS SECTION LOCATION (RIVER MILE)

NOTE: MILE 0.0 IS AT THE CONFLUENCE OF WHEATLAND CHANNEL AND SWAN CREEK CHANNEL.

## APPENDIX B

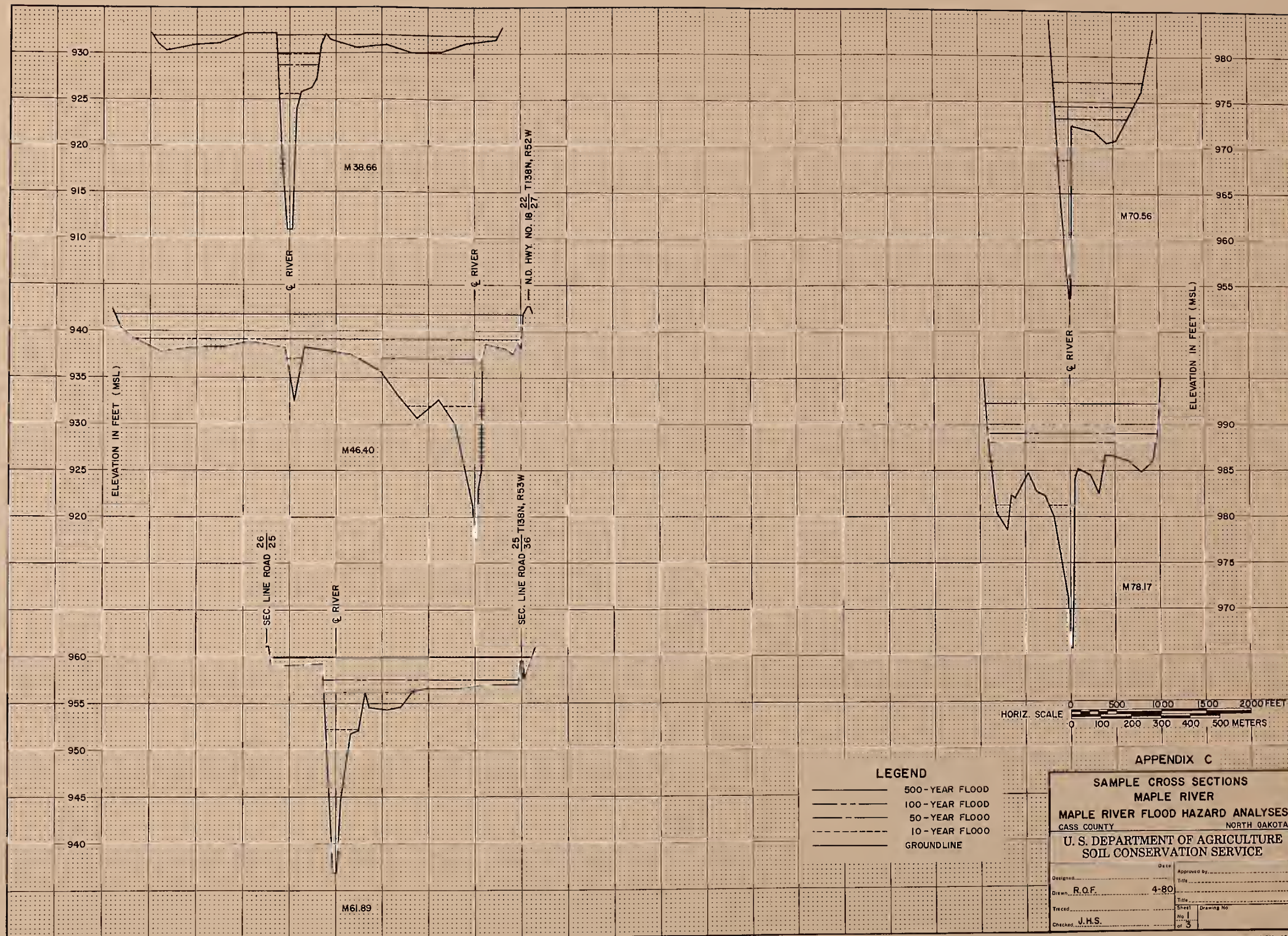
**WHEATLAND CHANNEL PROFILES**  
**MAPLE RIVER FLOOD HAZARD ANALYSES**  
 CASS COUNTY NORTH DAKOTA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn R.D.F.	11-79	Title
Traced	Sheet	Drawing No.
Checked J.H.S.	No.	
	of	





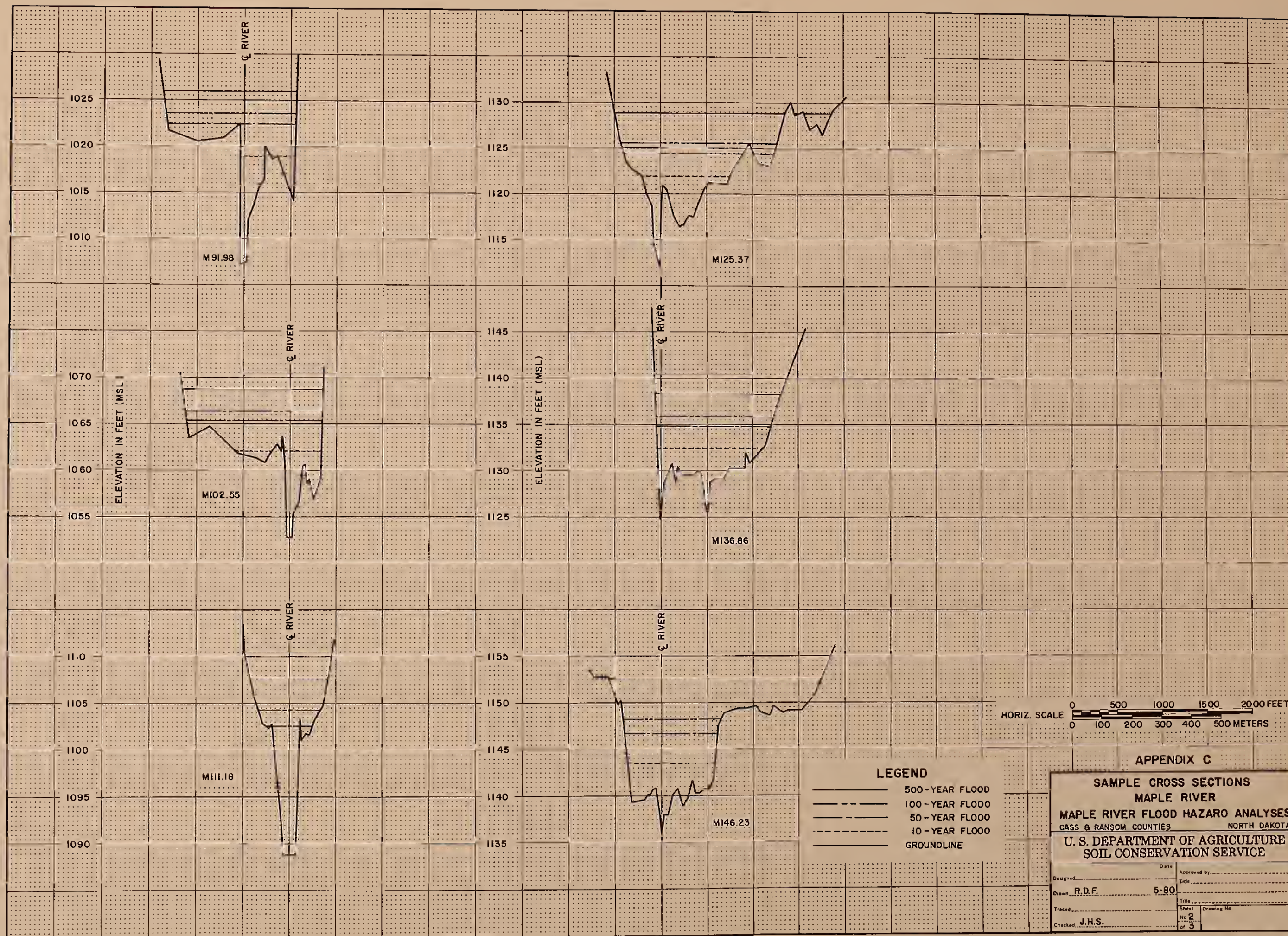








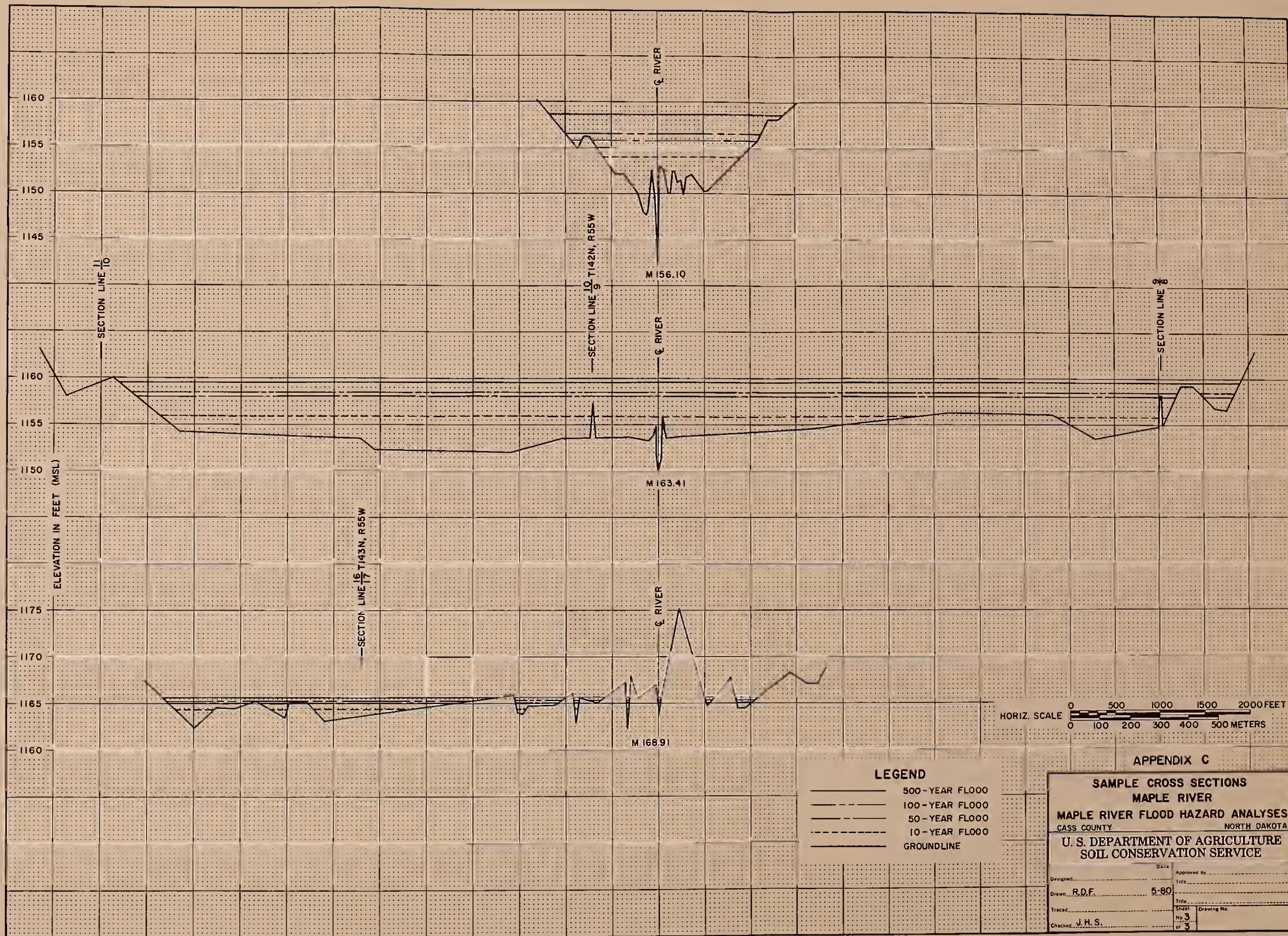












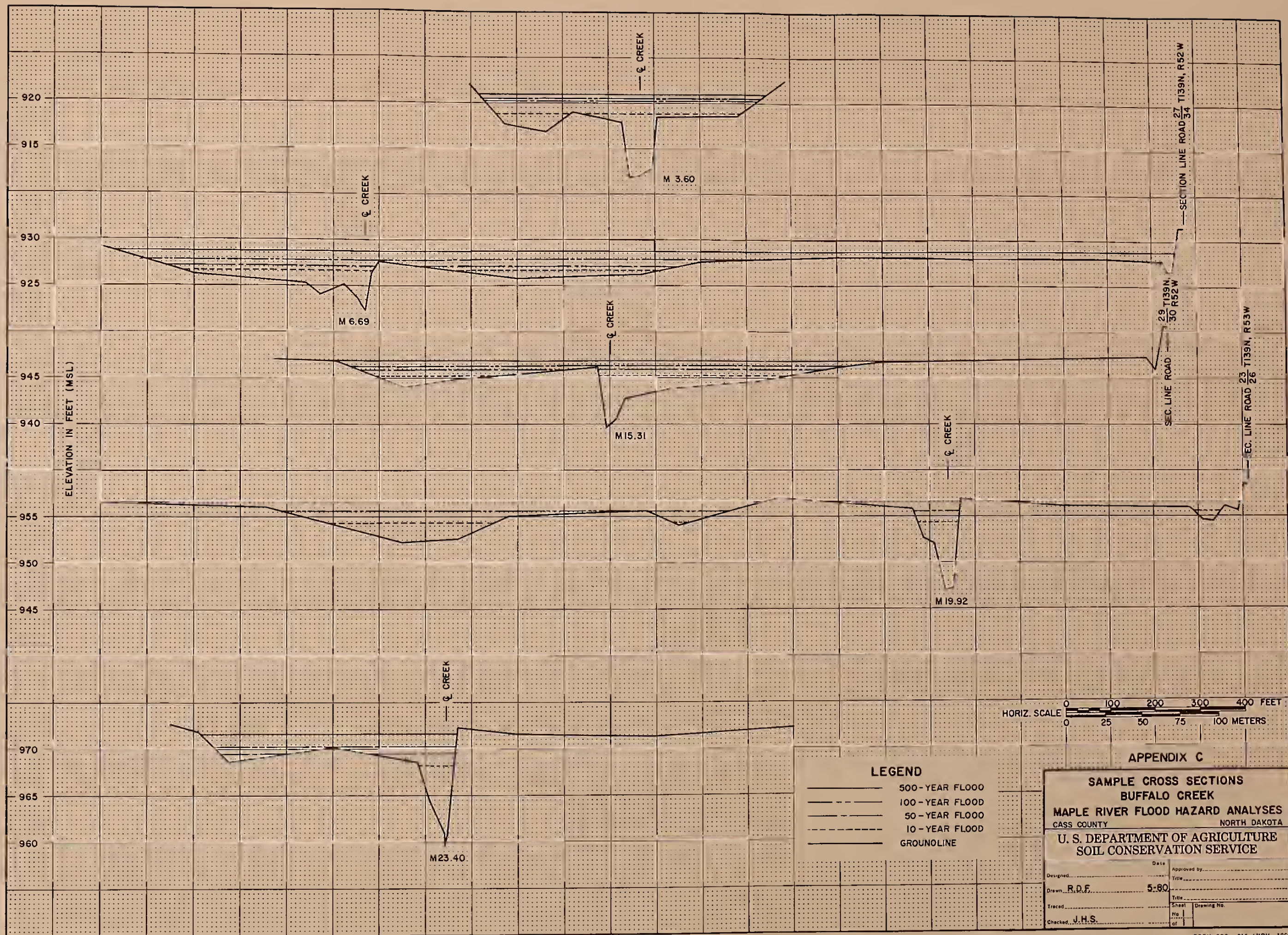
APPENDIX C

SAMPLE CROSS SECTIONS	
MAPLE RIVER	
MAPLE RIVER FLOOD HAZARD ANALYSES	
CASS COUNTY	NORTH DAKOTA
U. S. DEPARTMENT OF AGRICULTURE	
SOIL CONSERVATION SERVICE	
Date _____	
Approved by _____	
Title _____	
Drawn R.D.F. 5-80	
Title _____	
Traced _____	
No. 3	
Drawing No. _____	
Checked J.H.S.	
of 3	















# WATER SURFACE ELEVATION - FREQUENCY DATA

## MAPLE RIVER

### CASS AND RANSOM COUNTIES, NORTH DAKOTA

#### APPENDIX D

MAPLE RIVER EXISTING CONDITION				
	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
RIVER	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
MILE	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
0.0 <sup>1/</sup>	894.2	893.8	893.6	893.0
1.50	896.7	896.3	896.0	894.9
2.80	898.9	898.5	898.1	896.7
4.40	899.8	899.4	898.9	897.5
7.60	902.0	901.7	901.3	900.0
10.00	903.9	903.5	903.1	901.7
11.28	904.9	904.4	904.0	902.7
13.43	907.3	906.7	906.3	905.0
14.30	907.4	907.0	906.6	905.2
15.45	907.9	907.5	907.1	905.3
16.12	908.2	907.8	907.4	906.1
20.08	910.1	909.7	909.3	908.2
20.99	910.7	910.3	909.8	908.8
22.30	911.3	911.0	910.6	909.6
23.70	911.9	911.6	911.2	910.3
25.10	913.3	913.0	912.5	911.3
26.90	915.3	915.0	914.6	912.5
29.35	917.7	917.4	917.0	915.2
30.95	919.5	919.1	918.7	917.0
32.60	921.2	920.9	920.5	918.9
35.00	923.9	923.6	923.2	921.6
36.40	925.5	925.2	924.8	923.2
37.80	927.0	926.4	925.9	924.5
37.89	927.3	926.5	926.0	924.6

<sup>1/</sup> River mile 0.0 is at the confluence of the Sheyenne River and the Maple River.

MAPLE RIVER EXISTING CONDITION				
	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
RIVER	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
MILE	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
37.91	929.5	927.3	926.6	924.8
38.66	932.0	929.9	928.7	925.6
39.88	934.7	932.6	931.2	927.0
41.32	935.5	933.4	931.9	927.7
42.06	936.4	934.3	932.7	928.1
43.78	937.2	934.9	933.3	928.8
44.39	939.0	936.6	934.9	930.3
45.76	940.0	937.5	935.7	931.1
45.84	941.8	938.9	936.9	931.6
46.40	941.9	939.2	937.1	932.0
47.06	942.3	939.7	937.7	932.7
47.71	942.9	940.6	938.8	933.5
48.25	943.2	941.0	939.2	934.0
49.67	945.1	943.3	941.8	936.1
51.15	945.7	943.8	942.4	937.3
51.81	946.6	944.8	943.4	939.0
52.05	947.3	945.5	944.1	939.6
52.95	949.1	947.3	945.8	940.9
54.40	950.0	948.2	946.7	942.0
57.06	951.5	949.7	948.3	944.4
57.41	951.7	949.9	948.6	944.7
57.43	952.0	950.7	948.8	945.1
58.29	952.5	950.8	949.6	946.1
58.88	952.9	951.3	950.2	946.6
59.54	954.0	952.0	950.9	947.4
59.83	955.1	952.7	951.6	947.9
61.37	958.6	956.2	955.1	951.4
61.89	959.9	957.5	956.2	952.2
62.34	960.5	958.2	957.1	953.0
62.36	961.2	959.3	958.1	953.3
63.28	963.0	960.4	959.0	954.2
63.45	963.3	960.8	959.4	954.3
63.90	964.4	961.9	960.6	955.3
63.92	964.8	962.4	961.1	956.0



MAPLE RIVER EXISTING CONDITION				
	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
RIVER	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
MILE	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
66.15	968.0	965.6	964.5	959.0
68.09	970.2	968.2	967.4	963.2
69.63	974.1	971.8	970.9	966.8
69.65	974.4	972.1	971.0	967.2
70.56	977.2	974.5	973.2	968.6
71.11	978.7	975.9	974.5	969.7
72.17	980.2	977.2	975.8	971.3
72.43	980.9	978.0	976.7	972.2
72.79	981.8	979.0	977.7	972.9
74.22	984.3	981.7	980.4	975.0
74.88	985.0	982.3	981.1	975.6
74.90	985.5	982.7	981.3	976.1
75.36	986.7	983.7	982.2	976.9
75.86	988.2	985.3	983.8	978.0
76.88	989.6	986.7	985.2	979.1
77.61	991.2	988.0	986.4	980.1
77.62	992.1	988.9	987.8	980.5
78.17	992.3	989.1	988.0	981.2
78.56	992.9	989.7	988.5	981.7
79.38	994.3	990.9	989.6	983.2
80.09	995.8	992.7	991.4	985.1
80.88	996.7	993.7	992.4	986.0
80.90	998.5	995.7	994.3	988.1
81.98	999.2	996.4	995.1	989.7
82.38	1000.3	997.4	996.0	990.4
83.17	1002.4	999.3	997.8	992.0
84.07	1003.9	1001.4	1000.1	994.8
84.13	1004.3	1001.8	1000.6	995.9
84.73	1005.1	1002.4	1001.1	996.2
85.84	1006.4	1004.1	1002.8	998.3
86.30	1007.1	1004.7	1003.5	999.2
87.02	1009.6	1007.2	1006.1	1002.8
87.80	1012.2	1010.2	1009.1	1005.3
88.39	1014.0	1011.9	1010.9	1007.3

MAPLE RIVER EXISTING CONDITION				
RIVER	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
MILE	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
89.02	1014.6	1012.5	1011.6	1088.6
89.04	1015.2	1013.1	1012.2	1009.8
89.56	1017.8	1015.1	1013.9	1010.8
90.05	1019.7	1016.7	1015.4	1012.0
90.41	1022.0	1019.0	1017.6	1013.6
91.34	1023.8	1021.2	1019.9	1016.3
91.36	1024.2	1021.7	1020.5	1017.0
91.98	1026.0	1023.6	1022.4	1018.9
92.93	1027.7	1025.4	1024.2	1020.6
93.82	1029.9	1028.1	1027.3	1024.3
93.84	1030.3	1028.8	1028.2	1025.9
94.07	1030.7	1029.1	1028.5	1026.1
95.01	1033.7	1032.3	1031.8	1029.6
96.02	1038.0	1036.8	1036.2	1034.0
96.72	1039.4	1038.1	1037.4	1035.0
97.35	1042.7	1041.2	1040.5	1037.7
97.91	1046.3	1044.7	1043.9	1040.3
98.54	1048.9	1047.3	1046.5	1043.4
98.96	1051.7	1049.7	1048.7	1045.5
99.34	1054.6	1052.3	1051.2	1047.6
99.50	1055.2	1052.8	1051.7	1048.1
99.54	1058.1	1056.3	1055.8	1049.2
100.34	1061.2	1059.2	1058.4	1052.6
101.30	1064.1	1061.7	1060.6	1055.4
102.55	1068.8	1066.4	1065.4	1062.1
103.25	1071.6	1068.6	1067.3	1064.0
103.89	1073.9	1071.1	1069.9	1065.9
104.45	1074.6	1072.1	1071.0	1068.4
105.02	1075.7	1073.2	1072.1	1069.5
105.06	1076.0	1073.5	1072.5	1070.7
105.37	1076.6	1074.1	1073.1	1071.2
106.14	1079.9	1078.0	1077.0	1074.0
106.88	1085.4	1082.4	1080.8	1076.7
107.34	1087.4	1084.2	1082.7	1079.2



MAPLE RIVER EXISTING CONDITION				
RIVER MILE	: 500-YEAR : FREQ. FLOOD : ELEVATION : (M.S.L.)	: 100-YEAR : FREQ. FLOOD : ELEVATION : (M.S.L.)	: 50-YEAR : FREQ. FLOOD : ELEVATION : (M.S.L.)	: 10-YEAR : FREQ. FLOOD : ELEVATION : (M.S.L.)
107.36	1090.5	1088.1	1086.6	1081.1
107.72	1091.0	1088.6	1087.1	1081.6
108.05	1092.0	1089.3	1087.7	1082.3
108.32	1094.0	1090.9	1089.2	1084.3
108.81	1095.7	1093.1	1091.9	1088.0
108.86	1096.3	1093.9	1092.7	1088.3
109.57	1099.1	1096.6	1095.3	1091.2
109.96	1101.5	1098.7	1097.4	1093.0
110.23	1103.0	1100.1	1098.7	1094.4
110.54	1104.7	1101.7	1100.2	1096.0
110.58	1105.6	1102.5	1101.1	1096.6
110.81	1106.5	1103.2	1101.7	1097.3
111.18	1107.6	1104.3	1102.7	1098.0
111.46	1108.3	1104.9	1103.3	1098.5
111.83	1109.1	1105.6	1104.0	1099.5
111.86	1109.7	1106.0	1104.3	1099.7
111.87	1109.7	1106.0	1104.3	1099.7
112.19	1110.5	1106.8	1105.1	1100.5
112.51	1111.9	1108.4	1106.8	1102.5
112.91	1113.2	1109.7	1108.1	1103.9
113.15	1113.9	1110.4	1108.8	1104.7
113.69	1115.1	1111.7	1110.1	1106.2
114.21	1116.2	1112.8	1111.3	1107.3
114.35	1116.5	1113.2	1111.6	1107.6
114.37	1117.2	1113.7	1112.2	1107.7
114.85	1119.0	1115.4	1113.8	1109.2
115.42	1120.1	1116.5	1115.0	1110.7
115.65	1120.3	1116.8	1115.3	1111.2
115.66	1120.6	1117.1	1115.6	1111.4
116.39	1121.0	1117.4	1115.9	1111.8
116.92	1121.6	1118.1	1116.6	1112.4
117.42	1122.1	1118.6	1117.1	1113.0
117.45	1122.5	1119.0	1117.5	1113.6
118.02	1123.1	1119.8	1118.3	1115.0

MAPLE RIVER EXISTING CONDITION				
	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
RIVER	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
MILE	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
118.46	1123.4	1120.0	1118.5	1115.2
118.49	1124.0	1120.4	1118.8	1115.3
118.91	1124.6	1120.8	1119.2	1115.7
118.95	1124.6	1120.8	1119.3	1115.7
118.99	1125.0	1121.1	1119.6	1116.0
119.54	1125.4	1121.6	1120.0	1116.5
119.96	1125.6	1121.8	1120.2	1116.8
120.54	1126.1	1122.4	1120.9	1117.8
120.84	1126.2	1122.6	1121.1	1118.0
120.87	1126.6	1122.9	1121.4	1118.3
121.34	1126.8	1123.1	1121.6	1118.5
121.76	1127.0	1123.3	1121.8	1118.7
122.15	1127.1	1123.5	1122.0	1118.9
122.55	1127.3	1123.7	1122.3	1119.2
122.91	1127.4	1123.8	1122.4	1119.3
122.93	1127.6	1124.0	1122.6	1119.4
123.60	1127.8	1124.2	1122.8	1119.8
124.54	1128.3	1124.8	1123.5	1120.7
125.37	1128.8	1125.6	1124.4	1121.9
125.39	1129.1	1125.9	1124.7	1122.1
126.30	1129.7	1126.6	1125.5	1123.3
126.76	1130.0	1127.0	1125.9	1123.6
127.42	1130.4	1127.7	1126.6	1124.6
127.44	1130.7	1128.0	1126.8	1124.7
128.25	1130.8	1128.1	1126.9	1124.8
128.27	1131.0	1128.2	1127.0	1124.9
128.39	1131.3	1128.7	1127.7	1125.6
128.97	1132.2	1129.8	1128.7	1126.3
129.80	1132.6	1130.1	1129.0	1126.7
130.25	1132.9	1130.4	1129.3	1126.9
130.27	1133.0	1130.5	1129.4	1127.0
130.80	1133.3	1131.0	1130.1	1128.1
131.60	1133.8	1131.6	1130.8	1129.0
132.10	1134.3	1132.3	1131.4	1129.5



MAPLE RIVER EXISTING CONDITION				
RIVER	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
MILE	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
132.35	1134.5	1132.5	1131.7	1129.8
132.37	1134.7	1132.7	1131.8	1129.9
132.84	1134.9	1132.9	1132.0	1130.1
133.25	1135.5	1133.5	1132.6	1130.5
133.92	1135.7	1133.7	1132.8	1130.7
133.94	1135.9	1133.9	1132.9	1130.7
134.49	1136.1	1134.1	1133.1	1130.9
134.51	1136.3	1134.2	1133.2	1130.9
135.07	1137.2	1134.9	1133.9	1131.5
135.58	1137.3	1135.0	1134.0	1131.6
135.60	1137.5	1135.1	1134.1	1131.6
135.79	1137.6	1135.2	1134.2	1131.7
136.49	1137.9	1135.4	1134.4	1131.8
136.51	1138.2	1135.6	1134.5	1132.0
136.86	1138.4	1135.9	1134.8	1132.4
137.27	1138.5	1136.0	1134.9	1132.5
137.96	1139.0	1136.4	1135.3	1132.9
137.98	1139.8	1138.4	1137.8	1134.1
138.38	1140.0	1138.5	1137.9	1134.2
139.02	1140.3	1138.7	1138.1	1134.5
139.38	1140.5	1138.9	1138.2	1134.8
139.83	1140.8	1139.1	1138.3	1135.0
139.93	1140.9	1139.1	1138.4	1135.1
139.95	1141.2	1139.4	1138.6	1135.4
140.35	1141.8	1139.8	1139.0	1136.1
140.59	1141.9	1139.9	1139.1	1136.3
140.61	1142.0	1140.0	1139.2	1136.4
141.07	1142.4	1140.4	1139.6	1137.1
141.84	1143.1	1141.3	1140.5	1138.8
142.24	1143.7	1141.9	1141.2	1139.8
142.65	1144.1	1142.4	1141.7	1140.2
142.99	1144.4	1142.7	1142.0	1140.3
143.01	1144.6	1142.9	1142.2	1140.5
143.40	1144.9	1143.1	1142.3	1140.7

MAPLE RIVER EXISTING CONDITION				
RIVER MILE	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
143.42	1152.2	1147.6	1145.8	1142.1
143.87	1152.2	1147.6	1145.8	1142.2
144.12	1152.2	1147.7	1145.9	1142.3
144.44	1152.3	1147.7	1146.0	1142.5
144.46	1152.4	1147.8	1146.1	1142.6
144.94	1152.4	1147.9	1146.2	1142.9
145.48	1152.5	1148.0	1146.3	1143.2
146.23	1152.6	1148.2	1146.6	1143.5
146.56	1152.7	1148.3	1146.7	1143.6
146.58	1152.9	1148.5	1146.9	1143.7
146.85	1153.0	1149.0	1147.3	1144.4
147.40	1153.2	1149.3	1147.8	1145.0
147.76	1153.3	1149.4	1147.9	1145.2
148.06	1153.3	1149.5	1148.0	1145.3
148.08	1153.4	1149.6	1148.1	1145.4
148.47	1153.5	1149.8	1148.4	1145.7
148.49	1153.7	1150.0	1148.6	1146.0
148.93	1154.3	1150.7	1149.4	1146.8
149.35	1154.6	1151.2	1149.9	1147.3
150.09	1154.8	1151.4	1150.1	1147.5
150.11	1154.9	1151.5	1150.2	1147.6
150.67	1155.0	1151.8	1150.4	1147.8
150.69	1155.1	1151.7	1150.5	1147.9
151.07	1155.2	1151.9	1150.7	1148.3
151.60	1155.3	1152.1	1151.0	1148.6
152.03	1155.6	1152.5	1151.4	1149.1
152.05	1155.9	1152.8	1151.6	1149.6
152.34	1156.1	1153.1	1152.0	1149.9
152.53	1156.3	1153.3	1152.3	1150.2
153.23	1156.8	1154.1	1153.0	1150.9
153.38	1157.0	1154.4	1153.3	1151.1
153.40	1157.3	1154.6	1153.5	1151.2
153.90	1157.4	1154.7	1153.6	1151.3



MAPLE RIVER EXISTING CONDITION				
RIVER	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
MILE	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
154.17	1157.5	1154.8	1153.7	1151.4
154.43	1157.6	1155.1	1154.1	1151.4
154.55	1157.7	1155.2	1154.2	1151.9
154.57	1157.8	1155.3	1154.4	1152.5
154.94	1157.9	1155.4	1154.5	1152.6
155.36	1158.0	1155.6	1154.6	1152.8
155.58	1158.2	1156.0	1155.2	1153.4
155.60	1158.5	1156.3	1155.6	1153.7
155.85	1158.6	1156.4	1155.7	1153.8
156.10	1158.7	1156.6	1155.8	1154.0
156.43	1159.0	1157.0	1156.3	1154.5
156.58	1159.1	1157.3	1156.6	1154.8
156.60	1159.4	1158.3	1157.8	1155.1
156.84	1159.5	1158.4	1158.0	1155.5
157.96	1159.5	1158.4	1158.0	1155.5
159.12	1159.5	1158.4	1158.0	1155.5
160.16	1159.5	1158.4	1158.0	1155.5
160.39	1159.5	1158.4	1158.0	1155.5
160.71	1159.5	1158.4	1158.0	1155.5
161.21	1159.5	1158.4	1158.0	1155.5
162.29	1159.6	1158.5	1158.1	1155.7
162.31	1159.6	1158.5	1158.1	1155.9
163.41	1159.6	1158.5	1158.1	1155.9
164.56	1159.6	1158.5	1158.1	1156.0
164.58	1159.8	1158.9	1158.7	1156.6
165.08	1159.8	1158.9	1158.7	1156.6
165.10	1159.9	1159.4	1159.2	1157.2
165.52	1159.9	1159.4	1159.2	1157.2
166.41	1159.9	1159.4	1159.2	1157.2
167.20	1160.1	1159.5	1159.3	1157.6
167.22	1160.6	1160.2	1160.0	1159.1
167.93	1160.7	1160.2	1160.1	1159.1
168.10	1160.7	1160.3	1160.1	1159.2
168.34	1161.0	1160.5	1160.3	1159.5

MAPLE RIVER EXISTING CONDITION				
	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
RIVER	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
MILE	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
168.91	1165.7	1165.3	1165.1	1164.4
169.43	1166.2	1165.6	1165.3	1164.5
170.39	1167.9	1167.3	1166.9	1166.2
170.63	1170.9	1170.4	1170.1	1169.3



# WATER SURFACE ELEVATION - FREQUENCY DATA

## BUFFALO CREEK

### CASS COUNTY, NORTH DAKOTA

#### APPENDIX D

BUFFALO CREEK EXISTING CONDITION				
	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
RIVER	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
MILE <u>1</u> /	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
3.60	921.0	920.5	920.2	918.8
3.95	921.8	921.1	920.6	919.4
4.21	921.9	921.2	920.7	919.5
4.56	923.0	922.3	921.7	920.6
4.57	923.4	922.9	922.5	921.3
4.59	923.4	922.9	922.5	921.3
5.02	924.8	924.1	923.6	922.7
5.48	926.2	925.3	924.6	923.8
6.28	926.9	926.2	925.7	925.1
6.31	928.3	926.9	926.1	925.3
6.35	928.3	926.9	926.1	925.4
6.69	928.8	927.9	927.2	926.7
7.29	930.0	929.2	928.7	928.2
8.32	931.1	930.3	929.9	929.3
8.72	931.4	930.6	930.3	929.7
8.73	932.8	931.8	931.3	930.2
8.75	932.8	931.8	931.3	930.2
9.09	933.3	932.4	931.9	931.0
9.51	934.1	933.2	932.7	931.9
10.06	935.5	934.8	934.4	933.8
10.65	936.5	935.8	935.4	934.8
10.67	938.0	936.8	935.9	935.0
10.68	938.0	936.8	935.9	935.1
11.06	938.4	937.3	936.6	935.9
12.50	941.2	940.6	940.1	939.2
13.03	942.2	941.5	941.0	940.4
13.51	943.4	942.7	942.1	941.5
13.53	944.0	943.2	942.4	941.7

1/ River mile 0.0 is at the confluence of Buffalo Creek and the Maple River.

BUFFALO CREEK EXISTING CONDITION				
	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
RIVER	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
MILE <u>1</u> /	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
13.55	944.0	943.2	942.4	941.7
14.65	945.3	944.7	944.2	943.6
15.31	946.9	946.3	945.9	945.2
16.64	948.2	947.6	947.1	946.4
16.66	949.3	948.6	947.7	946.6
16.68	949.3	948.6	947.7	946.7
17.47	950.9	950.2	949.5	948.7
18.61	953.3	952.7	952.2	951.6
19.04	954.7	954.0	953.6	952.9
19.06	955.9	954.8	954.0	953.2
19.10	955.9	954.9	954.1	953.3
19.92	956.6	955.6	955.0	954.3
20.56	957.8	956.9	956.6	956.1
20.94	959.2	958.7	958.3	957.6
21.59	961.6	960.5	959.9	959.0
21.61	963.4	960.7	959.9	959.1
21.63	963.4	960.8	960.0	959.1
22.43	965.3	964.7	964.1	963.2
22.85	969.5	967.9	966.9	965.9
22.87	970.5	968.3	967.2	966.0
22.97	970.6	968.6	967.6	966.5
23.40	971.6	970.2	969.5	968.2
23.96	974.1	973.3	972.8	971.4

1/ River mile 0.0 is at the confluence of Buffalo Creek and the Maple River.



# WATER SURFACE ELEVATION - FREQUENCY DATA

## BUFFALO TRIBUTARY

### CASS COUNTY, NORTH DAKOTA

#### APPENDIX D

BUFFALO TRIBUTARY EXISTING CONDITION								
	:	500-YEAR	:	100-YEAR	:	50-YEAR	:	10-YEAR
	:	FREQ. FLOOD	:	FREQ. FLOOD	:	FREQ. FLOOD	:	FREQ. FLOOD
RIVER	:	ELEVATION	:	ELEVATION	:	ELEVATION	:	ELEVATION
MILE <sup>1/</sup>	:	(M.S.L.)	:	(M.S.L.)	:	(M.S.L.)	:	(M.S.L.)
0.09		932.9		932.5		932.0		930.1
0.12		932.9		932.5		932.0		930.1
0.40		933.0		932.5		932.0		930.4
0.42		933.7		933.5		932.9		931.3
0.44		933.7		933.5		932.9		931.3
0.73		934.0		933.6		933.1		932.4
1.31		936.8		936.3		935.8		935.4
1.65		939.1		938.4		938.1		937.9
1.67		940.8		940.6		940.1		939.1
1.69		940.8		940.6		940.1		939.1
2.16		941.4		941.1		940.9		940.5
2.67		944.2		943.7		943.4		942.9

<sup>1/</sup> River mile 0.0 is at the confluence of the Buffalo Tributary and river mile 8.40 of Buffalo Creek.

# WATER SURFACE ELEVATION - FREQUENCY DATA

## SWAN CREEK

### CASS COUNTY, NORTH DAKOTA

#### APPENDIX D

SWAN CREEK EXISTING CONDITION								
		500-YEAR	:	100-YEAR	:	50-YEAR	:	10-YEAR
		FREQ. FLOOD	:	FREQ. FLOOD	:	FREQ. FLOOD	:	FREQ. FLOOD
RIVER	:	ELEVATION	:	ELEVATION	:	ELEVATION	:	ELEVATION
MILE <u>1</u> /	:	(M.S.L.)	:	(M.S.L.)	:	(M.S.L.)	:	(M.S.L.)
2.04		913.1		912.7		911.3		910.4
2.46		913.8		913.2		912.0		911.0
2.50		914.4		913.5		912.4		911.2
3.07		915.0		914.5		913.8		912.9
3.75		916.5		916.4		916.3		916.2
4.38		919.1		919.0		918.9		918.8
4.77		920.4		920.3		920.2		920.1
4.79		920.8		920.7		920.6		920.5
5.08		921.8		921.7		921.6		921.5
5.28		922.2		922.1		922.0		921.9
5.56		924.6		923.9		923.4		922.5
5.80		925.0		924.1		923.6		922.6

<sup>1/</sup> River mile 0.0 is at the confluence of Swan Creek and the Maple River.



# WATER SURFACE ELEVATION - FREQUENCY DATA

## WHEATLAND CHANNEL

### CASS COUNTY, NORTH DAKOTA

#### APPENDIX D

WHEATLAND CHANNEL EXISTING CONDITION				
RIVER MILE <u>1</u> /	: 500-YEAR	: 100-YEAR	: 50-YEAR	: 10-YEAR
	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD	: FREQ. FLOOD
	: ELEVATION	: ELEVATION	: ELEVATION	: ELEVATION
	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)	: (M.S.L.)
0.34	913.7	913.1	911.9	910.9
1.03	914.9	914.4	913.8	913.3
1.47	916.1	915.4	914.8	914.3
1.86	917.4	916.8	916.3	915.9
1.88	919.3	917.8	917.0	916.3
2.29	919.6	918.8	918.2	917.9
2.70	920.6	920.0	919.8	919.5
3.33	922.4	921.8	921.5	920.9

1/ River mile 0.0 is at the confluence of the Wheatland Channel and Swan Creek.

## APPENDIX E

### INVESTIGATIONS & ANALYSES

#### Surveys

A bench mark circuit was established throughout the study area using U.S.G.S. Coast and Geodetic Bench Marks. Additional bench marks were established by the Soil Conservation Service throughout the study area to make water surface elevation usage more accessible for surveying. Elevation reference marks are scattered throughout the study area for easy accessibility. These reference marks can be used to determine flood elevation as indicated in this flood hazard analyses. Detailed locations, descriptions and elevations can be obtained from Table 1.

A total of 359 channel and flood plain cross sections, covering a channel mile distance of 206.4 miles, were analyzed.

The geometry of all bridges and culverts were measured and used in computing the water surface profiles.

Third order levels were used as the base of accuracy in field surveys.

All cross sections are located on the photomaps (Appendix A, Plates 1 to 89).

#### Photogrammetry

Three basic elements using photogrammetry were performed: Phase I consisted of the aerial photography. Both high and low level flights were made. The low level aerial photography was used for digitizing the cross sections and securing other topographic features. The high level photography was used for compilation of the final photo maps. Phase II consisted of the digitizing of the cross sections used in computing water surface profiles for the 10-, 50-, 100-, and 500-year floods. Phase III was the stereo plotting of the 100-year and 500-year curvilinear boundaries from elevations computed from water surface profiles.



## Hydrology & Hydraulics

The peak discharges for the 10-, 50-, 100- and 500-year frequencies were determined from procedures in Bulletin 17A, titled "Guidelines for Determining Flood Flow Frequency," developed by the United States Water Resource Council, dated June 1977.

Peak discharges varied throughout the study area depending on the contributing drainage area. The peak discharge decreased as the drainage area decreased.

The drainage area at the beginning of the study area is approximately 1457 square miles and 137 square miles at the end of the study area.

From river mile 0.0 which is the confluence of the Maple and Sheyenne Rivers, to river mile 37.9, historical data was used to determine and define the 100-year and 500-year flood plains. From river mile 37.9 to river mile 170.8 (end of study) water surface profiles were used to determine and define the 100-year and 500-year flood plains

The 100-year flood was computed to emphasize the effect of constrictions (bridge openings) on flooding and provide a basis for future improvement on the areas flooded. The 100-year flood also serves as the base flood which HUD considers as a minimum for flood insurance requirements.

Future projections indicate that expected encroachment will affect the flood stages a slight amount within the study area. The 100-year frequency flood stage can be further reduced by enlarging bridge openings.

## Natural and Beneficial Values

The North Dakota statewide 208 Water Quality Plan identifies the Maple River as having a water quality problem involving nitrates from nonpoint agricultural sources such as feedlot and eroded agricultural fields.

As a fishery resource, the Maple River is limited due to its pollution level and intermittent flow. Most of the species present are the result of upstream movement from the Sheyenne and Red Rivers during spring runoff. The species in the basin include northern pike, channel catfish, black bullhead, white sucker, carp, freshwater drum, fathead minnows, creek chub, blacknose dace and common shiver.

Existing native herbaceous vegetation within the flood plain is associated with high water table seepage areas. These areas are scattered and have saline characteristics, therefore, eliminating woodlands and agriculture. Existing woodland areas are predominate in the section from Enderlin to Mapleton. The major tree species are green ash, boxelder and elm. Limited species are oak, chokecherry, willow and dogwood.

The vast majority of wetlands in the flood plain have been converted to agriculture. It is estimated that less than 5 percent of the Maple River flood plain exists as wetland acreage. The remaining acreage is devoted to high, intensified agriculture.

Main recreational uses of the Maple River are fishing, canoeing, trapping, snowmobiling and cross country skiing.

Major wildlife species common to the Maple River flood plain are white tailed deer, cottontail, fox racoon, mink and muskrat.



# MAPLE RIVER



M-0.10 SECTIONS  $\frac{19, R. 49 W.}{24, R. 50 W.}$  T. 140 N.



M-0.57 SECTION 24, T. 140 N., R. 50 W.



M-2.80 SECTIONS 23 & 24, T. 140 N., R. 50 W.



M-6.89 SECTIONS 21 & 22. T. 140 N., R. 50 W.



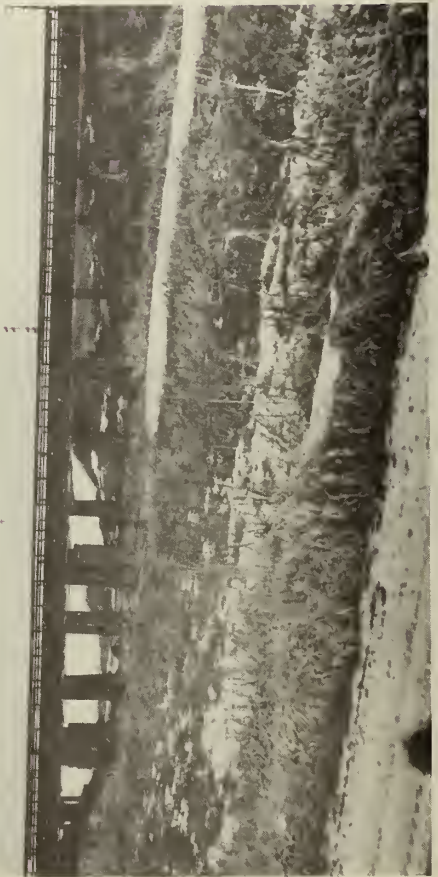
MAPLE RIVER



M-8.15 SECTIONS 21 & 20, T. 140 N., R. 50 W.



M-11.29 SECTION 31, R. 50 W. T. 140 N.  
SECTION 36, R. 51 W.



M-13.43 SECTION 1, T. 139 N., R. 51 W.



M-13.51 SECTION 1, T. 139 N., R. 51 W.



# MAPLE RIVER



M-16.05 INTERSTATE HIGHWAY  
SECTION 2, T. 139 N., R. 51 W.



M-16.10 CASS COUNTY HIGHWAY #10,  
SECTIONS 2 AND 11, T. 139 N., R. 51 W.

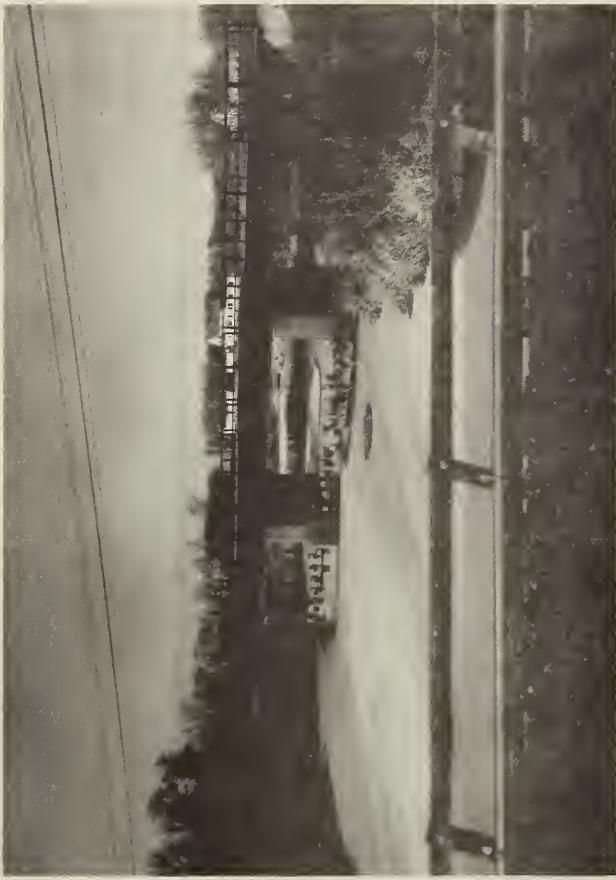


M-20.27 1/4 LINE BRIDGE, SECTION 10, T. 139 N., R. 51 W.



M-21.50 SECTIONS 9 AND 16, T. 139 N., R. 51 W.

# MAPLE RIVER



M-32.53 BURLINGTON NORTHERN RAILROAD BRIDGE  
SECTION 32, T. 139 N., R. 51 W.



M-34.12 SECTIONS 5 AND 8, T. 138 N., R. 51 W.



M-30.95 SECTIONS 28 AND 33, T. 139 N., R. 51 W.



M-32.56 SECTIONS  $\frac{32}{5}$ , T. 139 N. R. 51 W.  
 $\frac{5}{5}$ , T. 138 N.



# MAPLE RIVER



M-35.73 SECTIONS 7 & 18, T. 138 N., R. 51 W.



M-38.09 SECTIONS 13 & 24, T. 138 N., R. 52 W.



M-34.98 SECTIONS 7 & 8, T. 138 N., R. 51 W.



M-37.91 SECTION CORNERS  
18 & 19, R. 51 W. T. 138 N.  
13 & 24, R. 52 W.



# MAPLE RIVER



M-40.42 SECTIONS 13 & 24, T. 138 N., R. 52 W.



M-45.84 NORTH DAKOTA HIGHWAY #18  
SECTIONS 22 & 23, T. 138 N., R. 52 W.



M-57.43 SECTIONS 29 & 30, T. 138 N., R. 52 W.



M-52.95 SECTIONS 28 & 29, T. 138 N., R. 52 W.



# MAPLE RIVER



M-59.54 SECTIONS  $\frac{25, R. 53 W.}{30, R. 52 W.}$  T. 138 N.



M-62.36 SECTIONS 25 & 36, T. 138 N., R. 53 W.



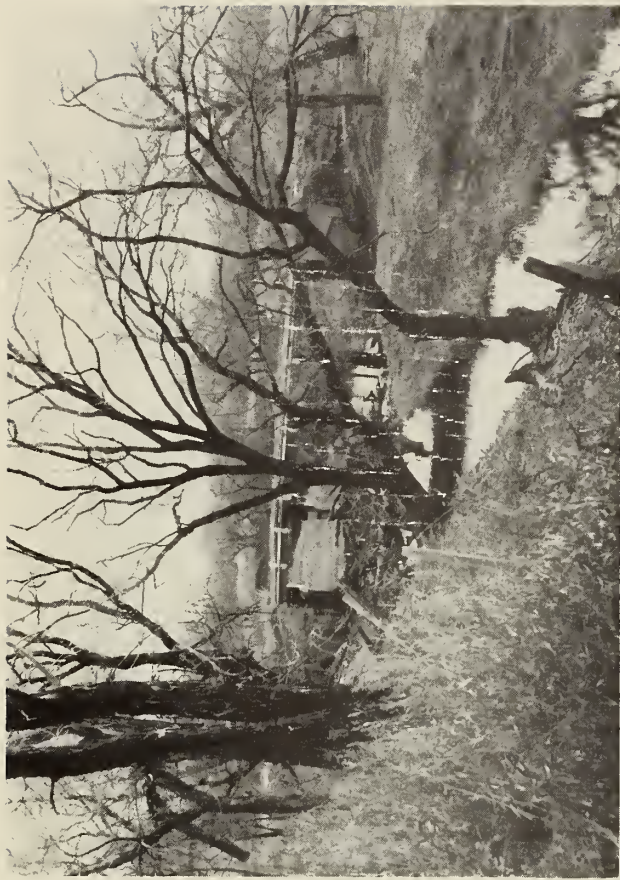
M-63.45 SECTION CORNERS  $\frac{25 \text{ \& } 26}{35 \text{ \& } 36}$  T. 138 N., R. 53 W.



M-63.92 SECTIONS 26 & 35, T. 138 N., R. 53 W.



# MAPLE RIVER



M-74.90 SECTION 4, T. 137 N., R. 53 W.



M-80.90 SECTIONS 7 & 8, T. 137 N., R. 53 W.



M-69.65 SECTIONS 34 & 35, T. 138 N., R. 53 W.



M-77.62 SECTIONS 8 & 9, T. 137 N., R. 53 W.



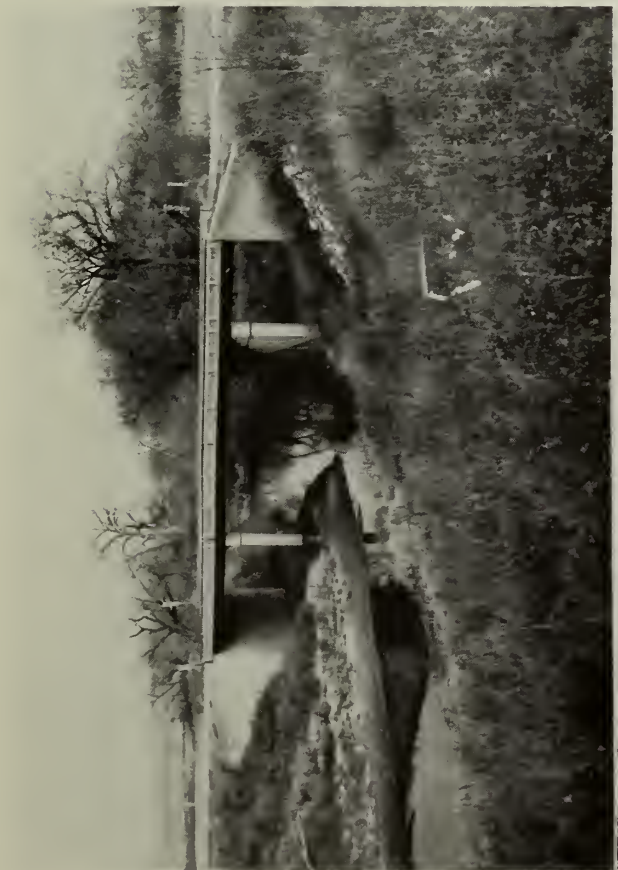
# MAPLE RIVER



M-87.43 SECTIONS 11 & 14, T. 137 N., R. 54 W.



M-91.36 SECTIONS 15 & 16, T. 137 N., R. 54 W.



M-84.13 SECTIONS  $\frac{18, R. 53 W.}{13, R. 54 W.}$  T. 137 N.



M-89.04 SECTIONS 14 & 15, T. 137 N., R. 54 W.



# MAPLE RIVER



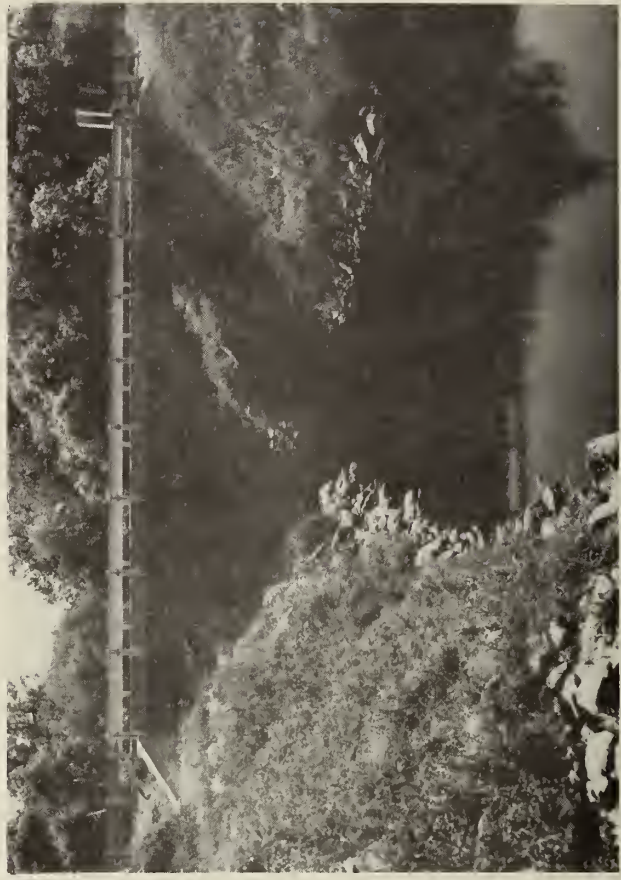
M-93.84 SECTIONS 21 & 28, T. 137 N., R. 54 W.



M-96.17 SECTIONS 29 & 32, T. 137 N., R. 54 W.



M-98.52 SECTIONS 31 & 32, T. 137 N., R. 54 W.



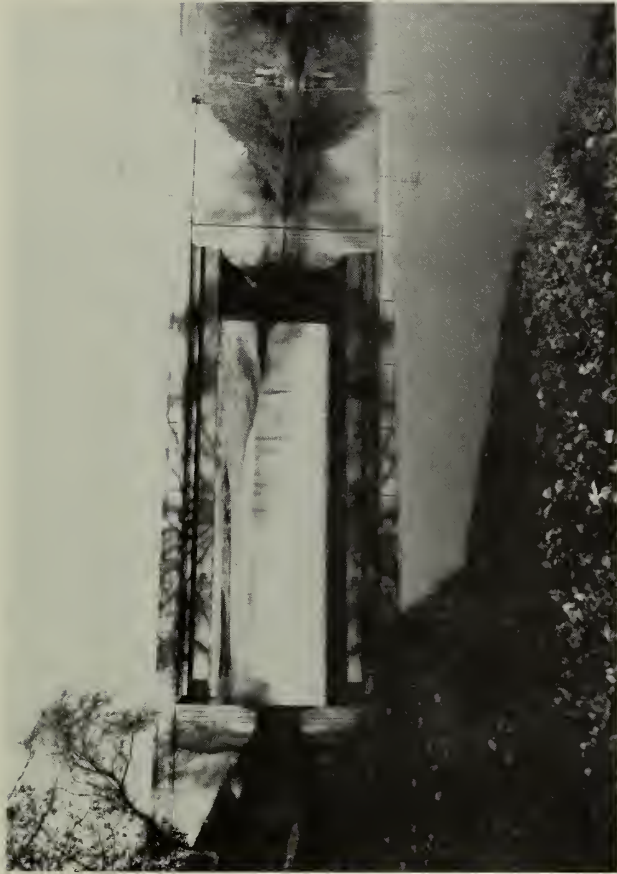
M99.54 NORTH DAKOTA HIGHWAY #46  
SECTIONS 31, T. 136 N., R. 55 W.  
31, T. 137 N., R. 54 W.



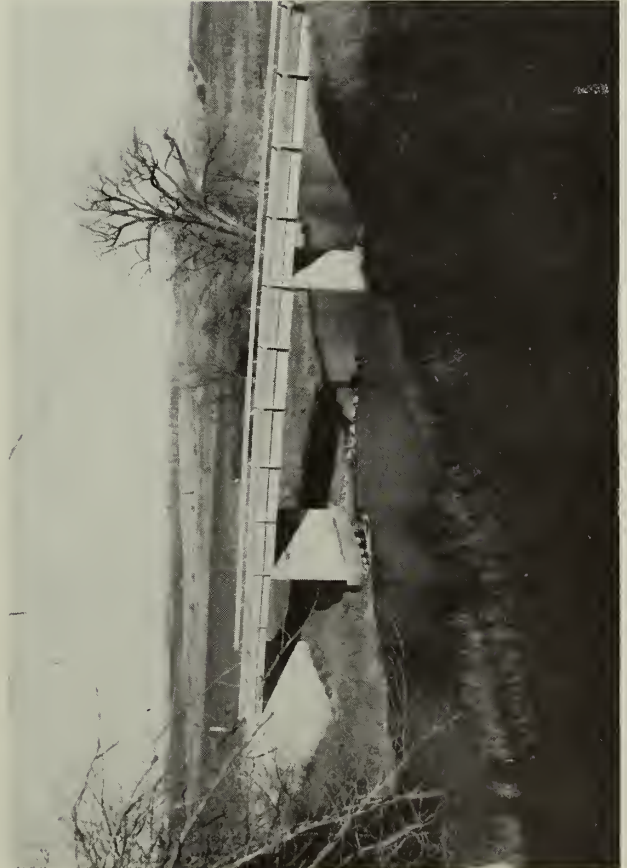
# MAPLE RIVER



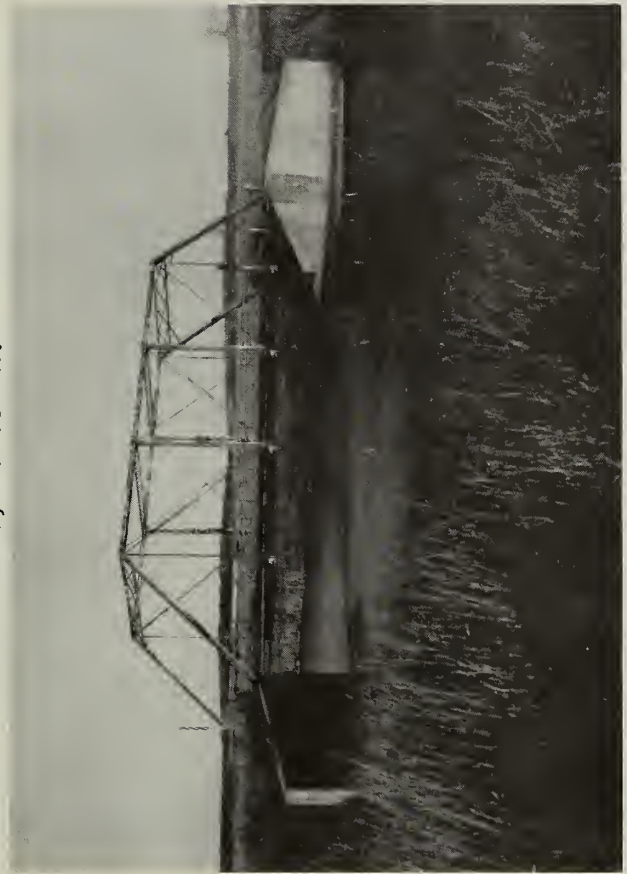
M-105.06 SECTIONS 2 & 3, T. 136 N., R. 55 W.



M-107.36 NORTH DAKOTA HIGHWAY #46  
SECTIONS <sup>4</sup><sub>34</sub>, T. 136 N. R. 55 W.  
T. 137 N.



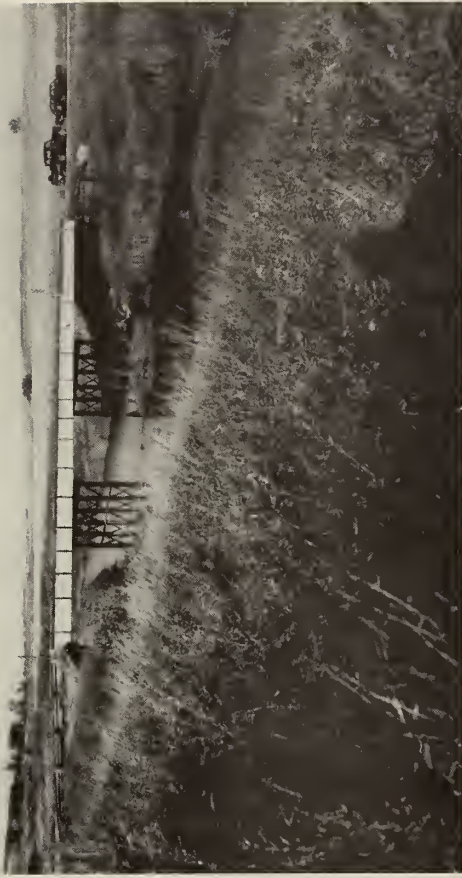
M-108.86 SECTION 34, T. 137 N., R. 55 W.



M-110.58 SECTIONS 28 & 33, T. 137 N., R. 55 W.



# MAPLE RIVER



M-114.37 SECTIONS 4 & 9, T. 137 N., R. 55 W.



M-117.45 SECTIONS 27 & 34, T. 138 N., R. 55 W.



M-111.86 SECTIONS 16 & 21, T. 137 N., R. 55 W.



M-115.66 SECTIONS 4, T. 137 N.  
33, T. 138 N. R. 55 W.



MAPLE RIVER



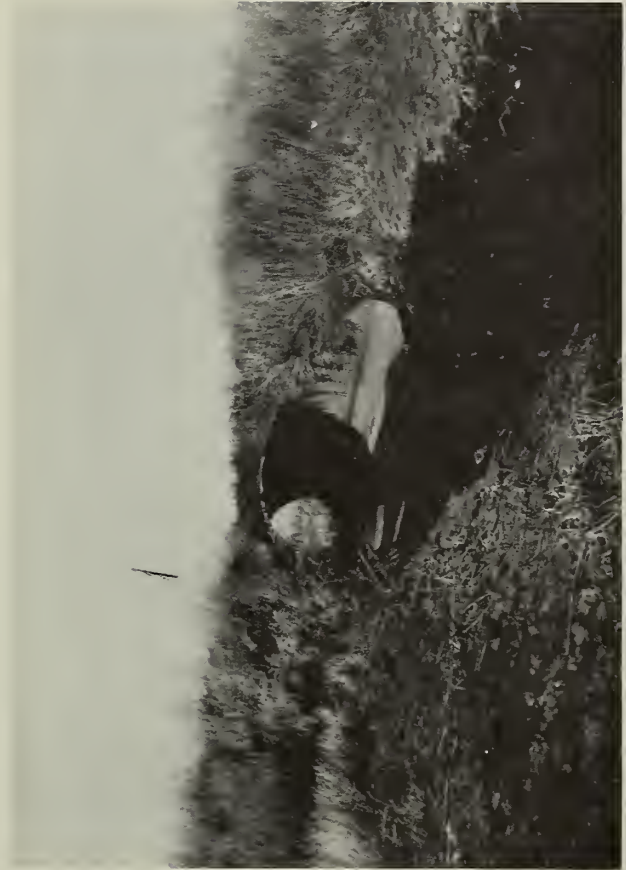
M-118.49 BURLINGTON NORTHERN RAILROAD BRIDGE  
IN SECTION 27, T. 138 N., R. 55 W.



M-118.99 SECTIONS 22 & 27, T. 138 N., R. 55 W.



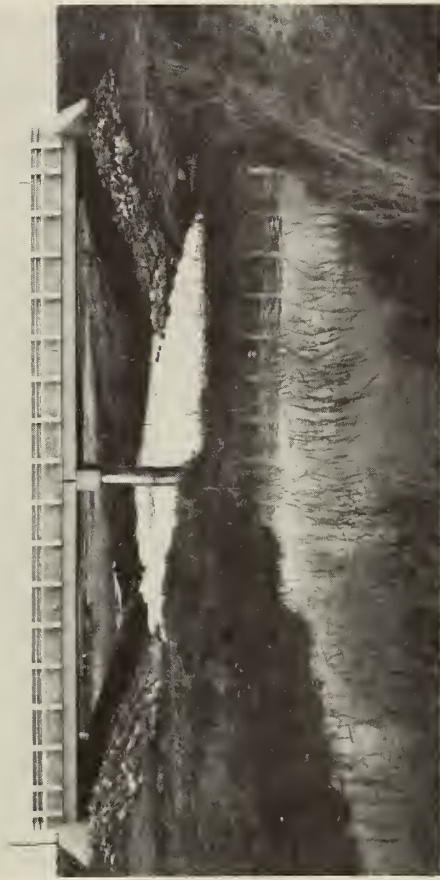
M-120.87 SECTIONS 15 & 22, T. 138 N., R. 55 W.



M-122.93 SECTIONS 10 & 15, T. 138 N., R. 55 W.



# MAPLE RIVER



M-127.44 SECTIONS 3 & 4, T. 138 N., R. 55 W.



M-130.27 SECTIONS 28 & 33, T. 139 N., R. 55 W.



M-125.39 SECTIONS 3 & 10, T. 138 N., R. 55 W.



M-128.27 SECTIONS  $\frac{4, T. 138 N.}{33, T. 139 N.}$  R. 55 W.



MAPLE RIVER



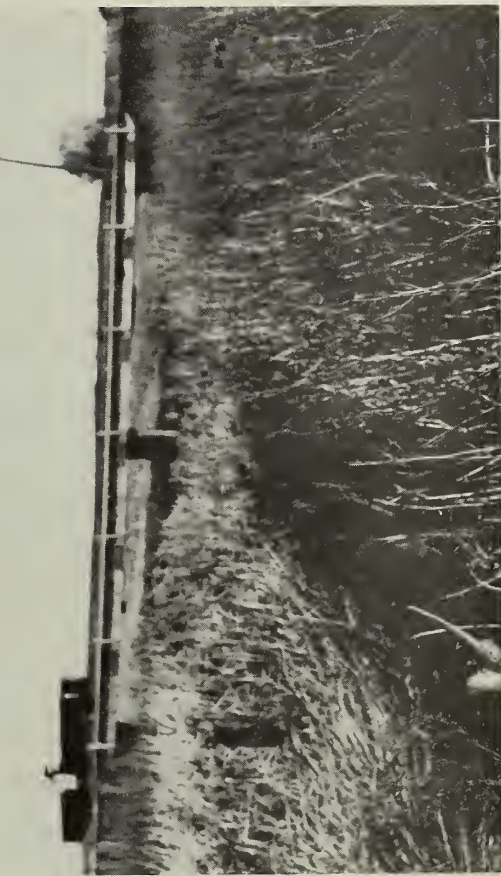
M-132.37 SECTIONS 21 & 28, T. 139 N., R. 55 W.



M-133.94 SECTIONS 21 & 22, T. 139 N., R. 55 W.



M-134.50 SECTIONS 15 & 22, T. 139 N., R. 55 W.



M-135.60 Sections 14 & 15, T. 139 N., R. 55 W.



# MAPLE RIVER



M-137.98 INTERSTATE HIGHWAY #94  
SECTIONS 2 & 11, T. 139 N., R. 55 W.



M-140.61 SECTIONS 34 & 35, T. 140 N., R. 55 W.



M-136.51 SECTIONS 11 & 14, T. 139 N., R. 55 W.



M-139.95 SECTIONS  $\frac{2, T. 139 N.}{35, T. 140 N.}$  R. 55 W.



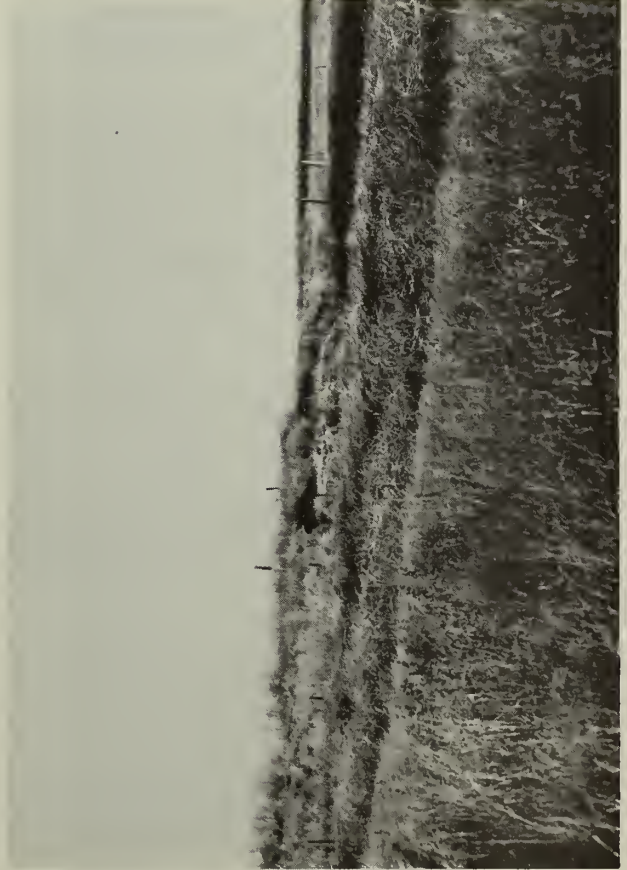
MAPLE RIVER



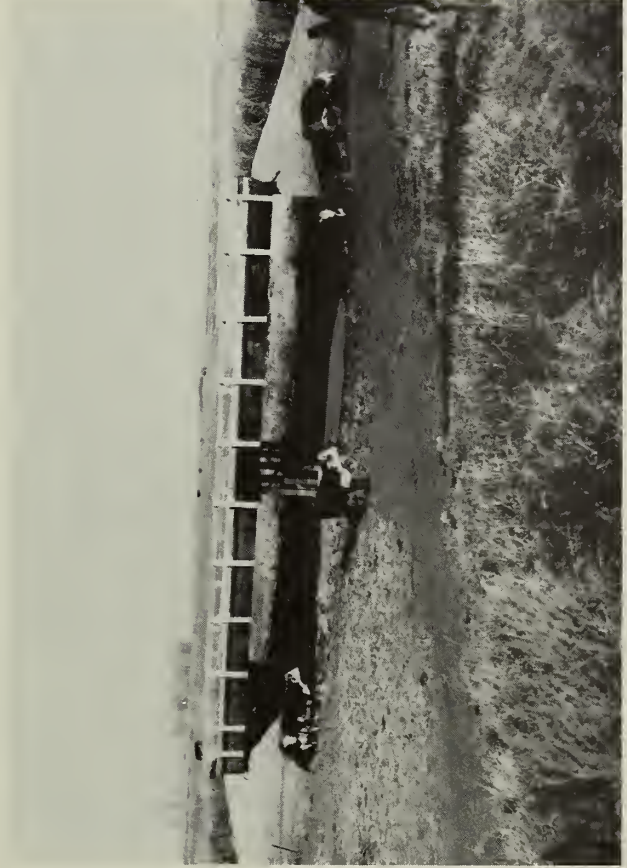
M-143.01 CASS COUNTY HIGHWAY #10  
SECTIONS 22 & 27, T. 140 N., R. 55 W.



M-143.42 BURLINGTON NORTHERN RAILROAD BRIDGE  
IN SECTION 22, T. 140 N., R. 55 W.



M-144.46 SECTIONS 15 & 22, T. 140 N., R. 55 W.



M-146.58 SECTIONS 11 & 14, T. 140 N., R. 55 W.



# MAPLE RIVER



M-148.08 SECTIONS 2 & 11, T. 140 N., R. 55 W.



M-148.49 SECTIONS 2 & 3, T. 140 N., R. 55 W.



M-150.11 SECTIONS  $\frac{3}{35}, \frac{T. 140 N.}{T. 141 N.}$  R. 55 W.



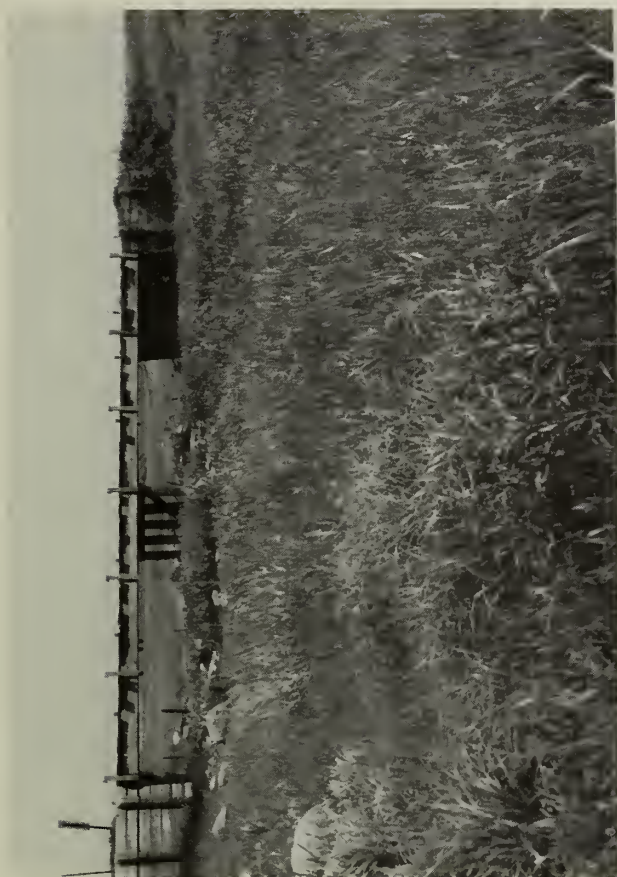
M-150.69 SECTIONS 34 & 35, T. 141 N., R. 55 W.



MAPLE RIVER



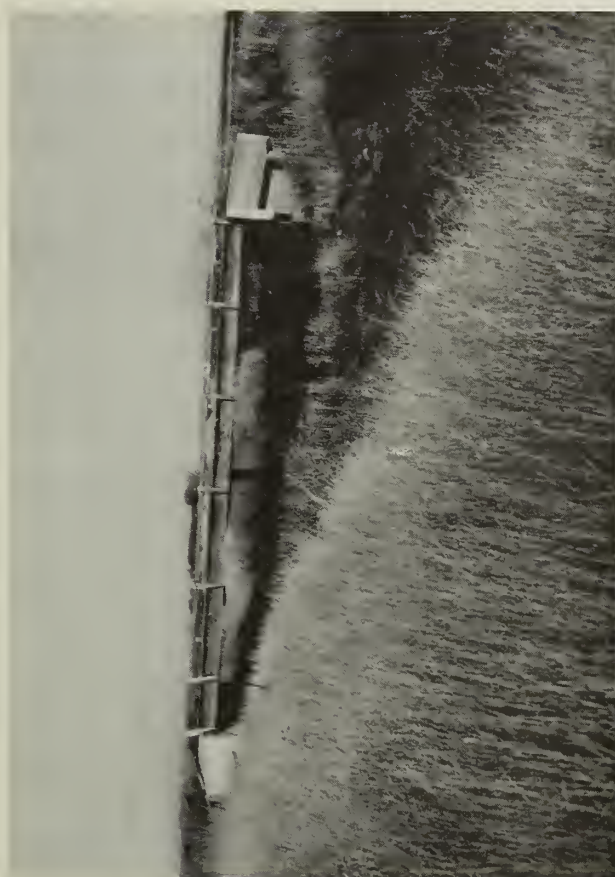
M-152.05 SECTIONS 27 & 34, T. 141 N., R. 55 W.



M-153.40 SECTIONS 22 & 27, T. 141 N., R. 55 W.



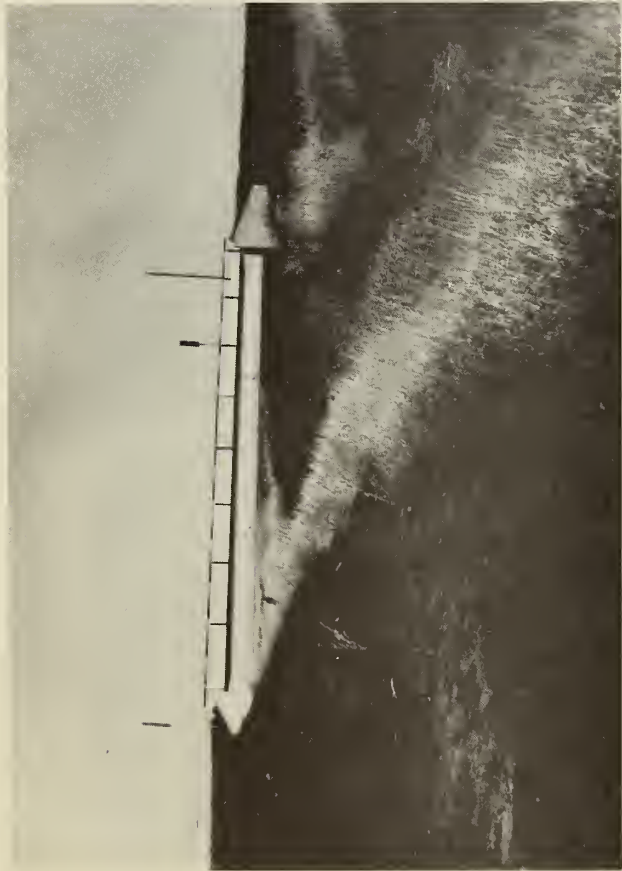
M-154.57 SECTIONS 15 & 22, T. 141 N., R. 55 W.



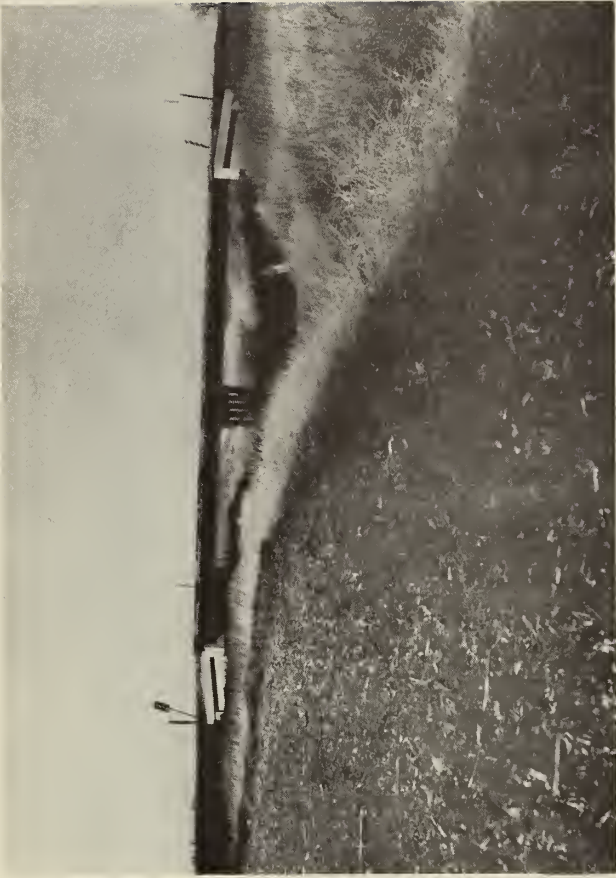
M-155.60 SECTIONS 10 & 15, T. 141 N., R. 55 W.



MAPLE RIVER



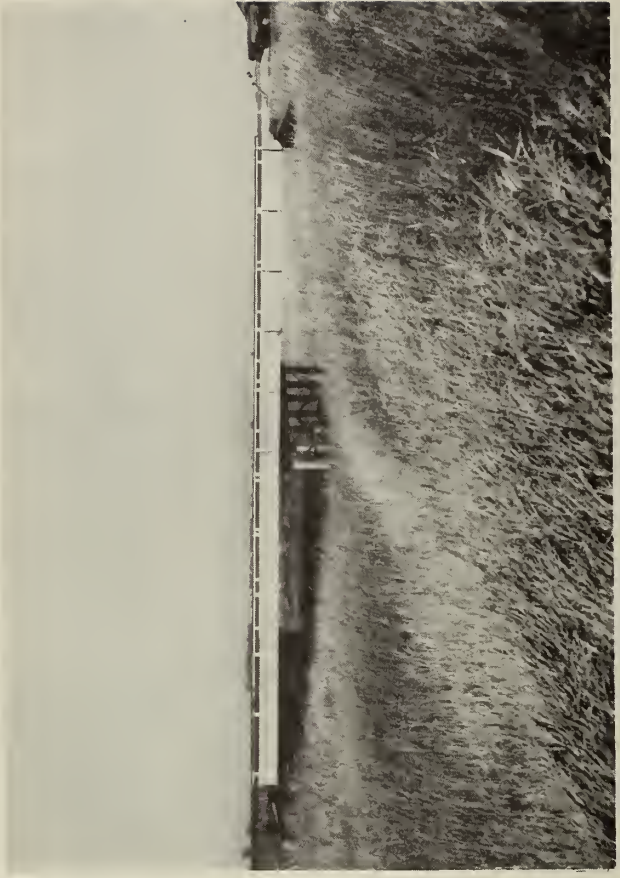
M-156.60 SECTIONS 3 & 10, T. 141 N., R. 55 W.



M-159.14 SECTIONS 28 & 33, T. 142 N., R. 55 W.



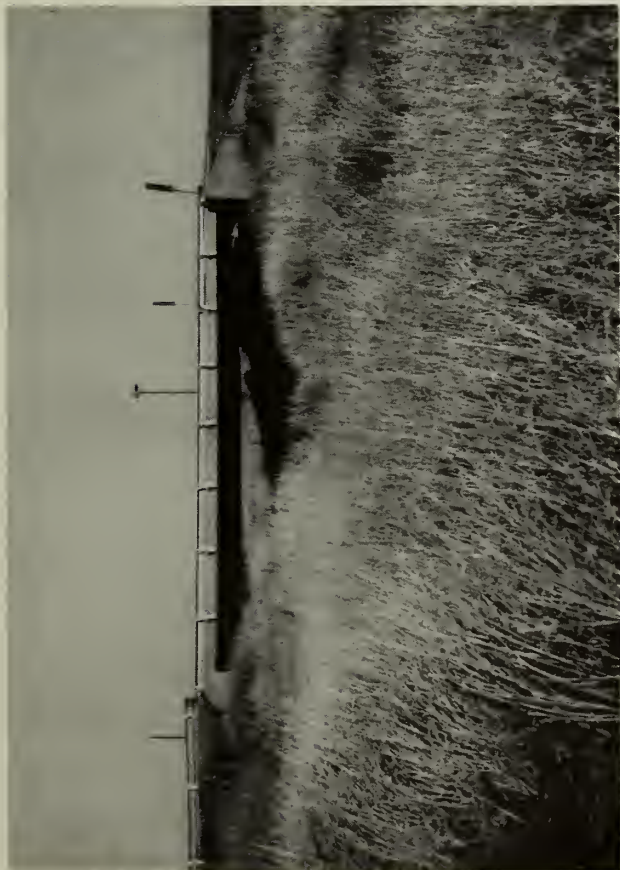
M-160.18 SECTIONS 21 & 28, T. 142 N. R. 55 W.



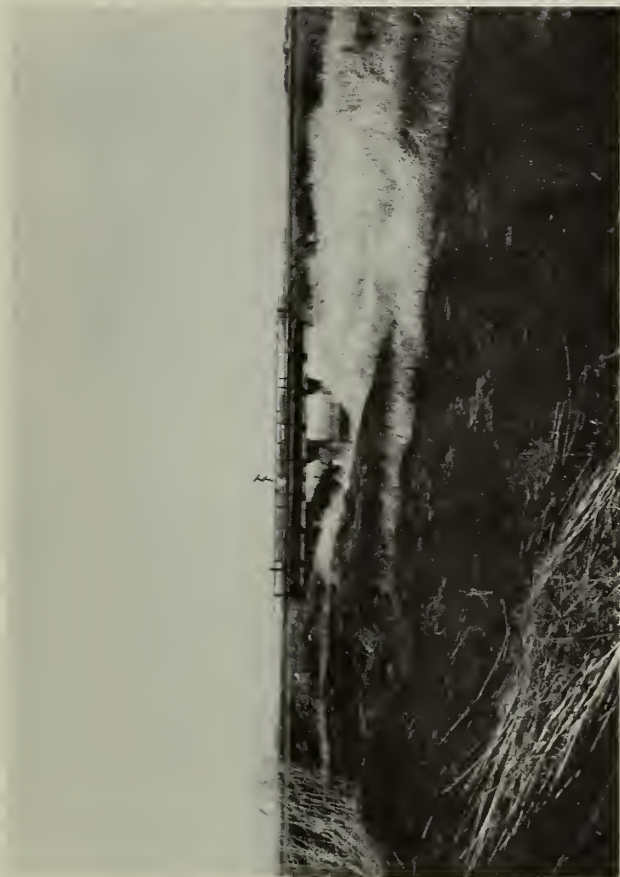
M-162.31 SECTIONS 9 & 16, T. 142 N., R. 55 W.



# MAPLE RIVER



M-164.58 SECTIONS  $\frac{3}{34}$ , T. 142 N. R. 55 W.  
 $\frac{34}{34}$ , T. 143 N.



M-165.10 BURLINGTON NORTHERN RAILROAD BRIDGE  
IN SECTION 34, T. 143 N., R. 55 W.



M-167.22 SECTIONS 21 & 28, T. 143 N., R. 55 W.



M-170.76 SECTIONS 17 & 18, T. 143 N., R. 55 W.



# BUFFALO CREEK



M-2.18 SECTIONS 29 & 30, T. 139 N., R. 51 W.

M-2.53 BURLINGTON NORTHERN RAILROAD BRIDGE  
IN SECTION 30, T. 139 N., R. 51 W.



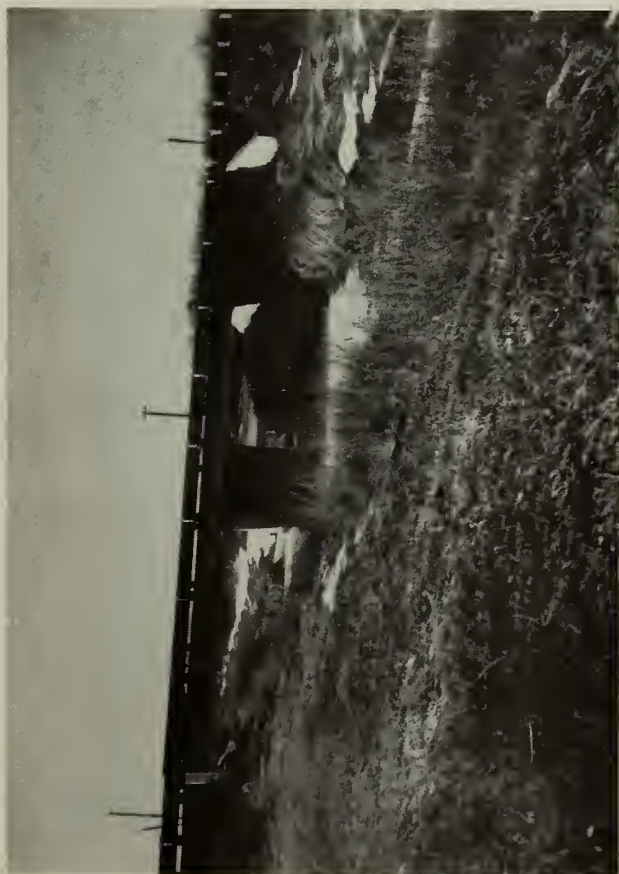
M-4.57 SECTIONS 35 & 36, T. 139 N., R. 52 W.



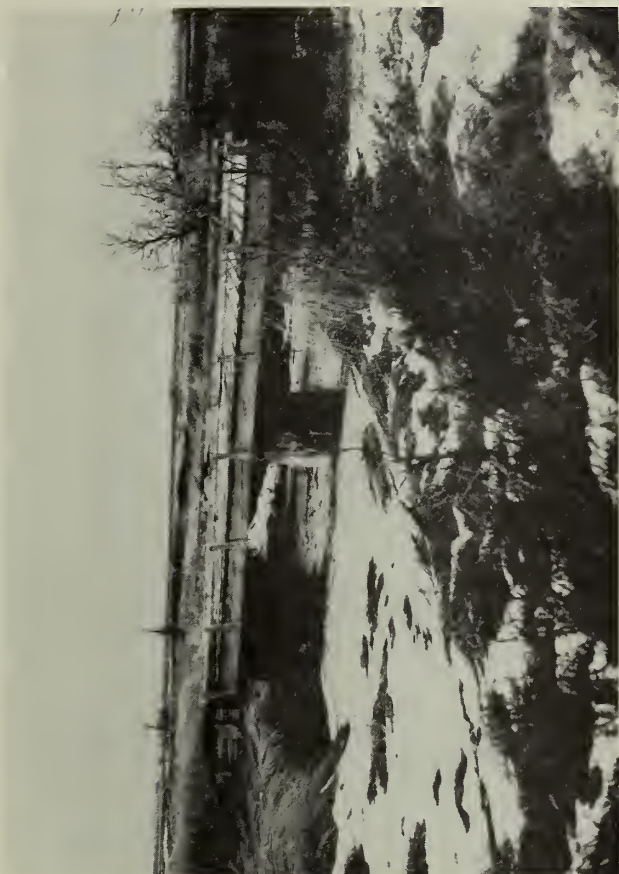
M-3.42 SECTIONS  $\frac{31, R. 51 W.}{36, R. 52 W.}$  T. 139 N.



# BUFFALO CREEK



M-6.31 NORTH DAKOTA HIGHWAY 18  
SECTIONS 26 & 27, T. 139 N., R. 52 W.



M-8.73 SECTIONS 33 & 34, T. 139 N., R. 52 W.



M-10.67 SECTIONS 28 & 29, T. 139 N., R. 52 W.



M-13.53 SECTIONS 29 & 30, T. 139 N., R. 52 W.



# BUFFALO CREEK



M-16.66 SECTIONS  $\frac{19, R. 52 W.}{24, R. 53 W.}$  T. 139 N.



M-19.06 SECTIONS 23 & 24, T. 139 N., R. 53 W.



M-21.61 SECTIONS 22 & 23, T. 139 N., R. 53 W.



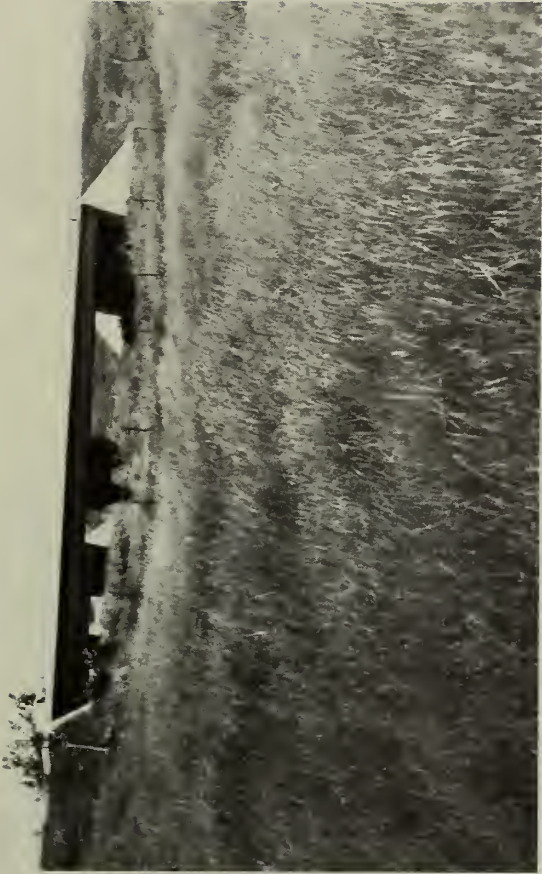
M-22.87 BURLINGTON NORTHERN RAILROAD BRIDGE  
IN SECTION 22, T. 139 N., R. 53 W.



SWAN CREEK



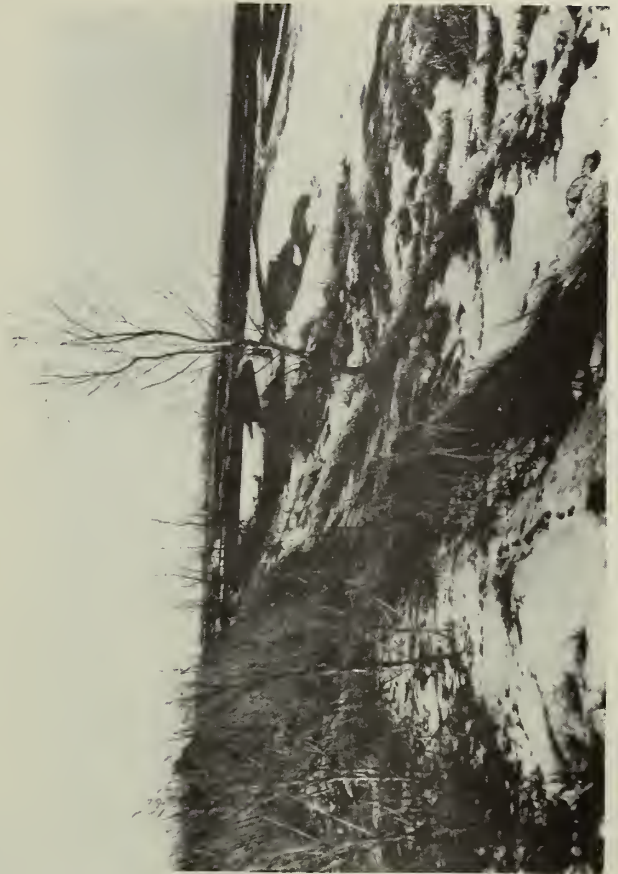
M-0.12 SECTION 9, T. 139 N., R. 51 W.



M-2.48 CASS COUNTY HIGHWAY #10  
SECTIONS 4 & 9, T. 139 N., R. 51 W.



M-2.50 INTERSTATE HIGHWAY #94  
IN SECTION 4, T. 139 N., R. 51 W.



M-4.79 SECTIONS 4 & 5, T. 139 N., R. 51 W.



BUFFALO CREEK TRIBUTARY



M-0.12 SECTION 27 & 34, T. 139 N., R. 52 W.



M-0.42 SECTIONS 33 & 34, T. 139 N., R. 52 W.



M-1.67 SECTIONS 32 & 33, T. 139 N., R. 52 W.



WHEATLAND CHANNEL



M-1.88 CASS COUNTY HIGHWAY #9  
SECTIONS 7 & 8, T. 139 N., R. 51 W.





## APPENDIX G

### GLOSSARY

Backwater - - The resulting high water surface in a given stream due to a downstream restriction or high stages in an intersecting stream.

Channel - - A natural or artificial watercourse with definite bed and banks to confine and conduct continuously or periodically flowing water.

Cubic Feet Per Second - - Rate of fluid flow at which one cubic foot of fluid passes a measuring point in one second (cfs).

Discharge - - The rate of flow or volume per unit of time. In this report discharge is expressed in cubic feet per second (cfs).

Flood - - An overflow of water onto lands not normally covered by water. The inundation is temporary and the land is adjacent to and inundated by overflow from a river, stream, ocean, lake or other body of standing water.

Flood Frequency - - An expression of how often a flood event of a given magnitude will, on the average, be equaled or exceeded. The word "frequency" often is omitted in discussing a flood event for the purpose of abbreviation.

#### Examples:

10-year flood or 10-year frequency flood - the flood which can be expected to be equaled or exceeded on an average of once in 10 years; and which would have a 10 percent chance of being equaled or exceeded in any given year.

50-year flood - ....two percent chance....in any given year.

100-year flood - ...one percent chance....in any given year.

500-year flood - ...two-tenths percent chance....in any given year.

## GLOSSARY (Cont.)

Flood Peak or Peak Discharge - - The highest stage or discharge attained during a flood.

Flood Plain, Flood Prone Area or Flood Hazard Area - - Land adjoining a stream (or other body of water) which has been or may be covered by water.

Flood Plain Encroachment - - Placement of fill or structures in the flood plain which may impede flood flow and cause backwater.

Flood Proofing - - A combination of structural provisions, changes or adjustments to properties and structures subject to flooding for the reduction or elimination of flood damages to properties, water and sanitary facilities, structures, and contents of buildings in a flood hazard area.

Flood Routing - - Computation of the changes in the rise and fall in streamflow as a flood moves downstream. The results provide hydrographs of discharge versus time at given points on the stream.

Flood Stage - - The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area.

Hydrograph - - A plotted curve showing the rise and fall of flood discharge with respect to time at a specific point on a stream.

Natural Storage Area - - In this report, refers to depressional areas, marshes, lakes and swamps that temporarily store a portion of the surface runoff.

Runoff - - In this report, refers to the portion of precipitation (including snowmelt) that flows across the land surface and contributes to stream or flood flow.



## GLOSSARY (Cont.)

Stage-Discharge Curve - - A plotted curve showing elevations resulting from a range of discharges at a point on a stream.

Stage-Storage Curve - - A plotted curve showing the accumulated storage available for floodwater upstream from a point on a stream versus the stage at that point.

Valley Cross Section - - The relationship of the elevation of the ground to the horizontal distance across a valley perpendicular to the direction of flow.

Watershed - - A drainage basin or area which collects runoff and transmits runoff to the outlet of the basin.

Watershed Boundary or Drainage Boundary - - The divide separating one drainage basin from another.

Water Surface Profile - - The relationship of water surface elevation to stream channel elevation at points along a stream, generally drawn to show the water surface elevation for the peak of a specific flood, but may be prepared for conditions at any given time.

TABLE 1

## ELEVATION REFERENCE MARKS

## MAPLE RIVER FLOOD HAZARD ANALYSES

## (CASS AND RANSOM COUNTIES)

R.M. No.	Elevation (MSL)	R.M.'s Description
E $\frac{1}{/}$	896.88	Approximately 4 miles north of West Fargo, Cass County, ND. Near the NE corner of Section 24, T140N, R50W, top of north bolt on west wheel guard on the bridge over the Maple River.
F $\frac{1}{/}$	903.97	Approximately 3 miles west and 3 1/2 miles north of West Fargo, Cass County, ND. Top of north bolt on east wheel guard of bridge over the Maple River between Sections 21 and 22, T140N, R50W.
G $\frac{1}{/}$	903.18	Approximately 2 miles east and 2 miles north of Mapleton, Cass County, ND. Near the SE corner of Section 20, T140N, R50W. A chiseled X on the NW wing-wall of the bridge over the Maple River.
H $\frac{1}{/}$	904.10	At Mapleton, Cass County, ND. Near the NE corner of Section 1, T139N, R51W. A spike in the piling of the bridge over the Maple River, 0.6 feet below the deck elevation on the SE corner of the bridge.
M-11 $\frac{1}{/}$	910.38	Approximately 1 mile south and 1 1/2 miles west of Mapleton, Cass County, ND. Near the north 1/4 line of Section 11, T139N, R51W. A bolthead in the concrete wheel guard at the bridge over the Maple River on the frontage road, 0.5 feet above deck elevation.
M-10 $\frac{1}{/}$	911.48	Approximately 2 1/2 miles west and 1 1/2 miles south of Mapleton, Cass County, ND. Near the center of Section 10, T139N, R51W. Top of bolthead 1 foot south of the NW corner of the bridge over the Maple River.
M-4 $\frac{1}{/}$	913.54	Approximately 1/2 mile east and 1 1/2 miles north of Durbin, Cass County, ND. Near the SW corner of Section 21, T139N, R51W. A railroad spike in a power pole.

$\frac{1}{/}$  Reference marks established by SCS.



R.M. No.	Elevation (MSL)	R.M.'s Description
M-2 $\frac{1}{1/}$	916.83	Approximately 1/2 mile north and 1 mile east of Durbin, Cass County, ND. On the north side of Section 33, T139N, R51W. A chiseled X in the SE wing-wall of a bridge over the Maple River.
M-33 $\frac{1}{1/}$	924.27	Approximately 1 1/2 miles south of Durbin, Cass County, ND. Between Sections 5 and 8, T138N, R51W. On a bridge over the Maple River. Top of bolthead 5 feet east of the NW corner of the bridge deck, 0.5 feet above deck elevation.
M-31 $\frac{1}{1/}$	923.39	Approximately 1/2 mile west and 2 miles south of Durbin, Cass County, ND. Between Sections 7 and 8, T138N, R51W. Top of bolthead 9.5 feet north of the SE corner of the bridge over the Maple River and 0.5 feet above deck elevation.
M-29 $\frac{1}{1/}$	925.30	Approximately 2 1/2 miles south and 1 mile west of Durbin, Cass County, ND. Between Sections 7 and 18, T138N, R51W. Top of bolthead on wheel guard, 0.8 feet above deck elevation, 1.5 feet west of the SE corner of the bridge deck of a bridge over the Maple River.
M-26 $\frac{1}{1/}$	924.87	Approximately 2 1/2 miles south and 1 1/2 miles west of Durbin, Cass County, ND. Near the NE corner of Section 24, T138N, R52W. Top of bolthead 1.0 foot north of the SW corner of the bridge and 0.5 feet above the deck of a bridge over the Maple River.
UE $\frac{2}{2/}$	937.76	Approximately 9.5 miles south of Casselton, Cass County, ND. Between Sections 22 and 23, T138N, R52W, 48 feet south and 16 feet east of the center-line of the bridge over the Maple River. On the south end of the east curb, 0.9 feet above the bridge deck. A chiseled square.
TT 70 JA $\frac{2}{2/}$	940.46	Approximately 11.75 miles south and 1.5 miles west of Casselton, Cass County, ND. Near the corner of Sections 27, 28, 33 and 34, T138N, R52W, 35 feet south and 150 feet west of the crossroads. A standard tablet set in a concrete post and stamped "TT 70 JA".
M-43 $\frac{1}{1/}$	934.76	Approximately 2.8 miles south of Lynchburg, Cass County, ND. Between Sections 28 and 29, T138N, R52W. A spike in the SW piling of a bridge over the Maple River, 1.8 feet lower than bridge deck.

$\frac{1}{1/}$  Reference marks established by SCS.

$\frac{2}{2/}$  Reference marks established by U.S.G.S.

<u>R.M. No.</u>	<u>Elevation (MSL)</u>	<u>R.M.'s Description</u>
56 FWK <u>2/</u>	949.43	Approximately 3 miles south and 3 1/2 miles east of Chaffee, Cass County, ND. Near the corner of Sections 29, 30, 31 and 32, T138N, R52W, 228 feet south and 48 feet east of crossroads. A standard tablet set in concrete and stamped "56 FWK 1958".
M-53 <u>1/</u>	950.37	Approximately 2 miles south and 2 1/2 miles east of Chaffee, Cass County, ND. Near the NE corner of Section 25, T138N, R53W. Spike in piling in the SW corner of the bridge over the Maple River, 1.3 feet lower than the deck.
M-58 <u>1/</u>	957.72	Approximately 3 miles south and 1 mile east of Chaffee, Cass County, ND. Between Sections 26 and 35, T138N, R53W. A spike in the SW piling of a bridge over the Maple River, 0.4 feet lower than the deck elevation.
M-61 <u>1/</u>	968.21	Approximately 4 miles south of Chaffee, Cass County, ND. Between Sections 34 and 35, T138N, R53W. Top of a bolthead on the SW corner of the bridge, 0.5 feet higher than the deck on the bridge over the Maple River.
UE <u>2/</u>	975.92	Near the center of Section 4, T137N, R53W, 30 feet south and 10 feet east of centerline of bridge over Maple River. A chiseled square on SE wingwall, 0.3 feet lower than deck.
M-69 <u>1/</u>	988.33	Approximately 7 miles west and 3 miles north of Leonard, Cass County, ND. Between Sections 8 and 9, T137N, R53W. Top of steel pile closest to bridge deck at the SE corner of bridge over Maple River, 0.9 feet higher than the south end of the bridge deck.
M-71 <u>1/</u>	991.52	Approximately 8 miles west and 2 miles north of Leonard, Cass County, ND. Between Sections 7 and 18, T137N, R53W. Top of bolthead, 2 feet east of the SW corner of the bridge over the Maple River, 0.5 feet higher than the deck.
M-72A <u>1/</u>	1000.10	Approximately 8.5 miles south of Embden, Cass County, ND. Between Sections 18, T137N, R53W and 13, T137N, R54W. A chiseled X on the west centerline of curb on bridge over the Maple River, 0.8 feet higher than the deck.

1/ Reference marks established by SCS.  
2/ Reference marks established by U.S.G.S.



R.M. No.	Elevation (MSL)	R.M.'s Description
UE <sup>2/</sup>	1016.85	Between Sections 15 and 16, T137N, R54W, 13 feet west of centerline of bridge over Maple River. A chiseled square on west curb, 0.8 feet higher than deck.
M-82 <sup>1/</sup>	1036.48	Approximately 4 miles east and 1 mile north of Enderlin, Cass County, ND. Near the SE corner of Section 29, T137N, R54W. On bridge over the Maple River. A bolthead 2 feet east of the NW corner of the deck and 0.8 feet high.
M-92 <sup>1/</sup>	1054.78	Approximately 2 1/2 miles east of Enderlin on State Highway #46 on the south side of Section 31, T137N, R54W. Top of the NE wingwall.
M-99 <sup>1/</sup>	1073.08	Approximately 1/2 mile east of Enderlin, Ransom County, ND. On bridge over Maple River between Sections 2 and 3, T136N, R55W. On bolthead 1.0 feet south of the NE corner, 0.7 feet above the deck.
M-101 <sup>1/</sup>	1089.66	At Enderlin, ND. Red chiseled X on center post on north railing of bridge over the Maple River on State Highway #46, 4 feet above the deck.
UE <sup>2/</sup>	1095.01	Approximately 1 mile NW of Enderlin, Cass County, ND. Near the NW corner of Section 34, T137N, R55W, 49 feet north and 13 feet west of centerline of the bridge over the Maple River on NW wingwall. A chiseled square, 0.2 feet higher than the deck.
TT 57 JA <sup>2/</sup>	1144.098	Approximately 2.5 miles north and 0.75 miles west of Enderlin, Cass County, ND, 290 feet south and 53 feet west of the NE corner of Section 28, T137N, R55W. A standard tablet stamped "TT 57 JA" and set in a concrete post.
M-102 <sup>1/</sup>	1096.73	Approximately 2.5 miles north and 1.5 miles west of Enderlin, Cass County, ND. Between Sections 28 and 21, T137N, R55W. On the bridge over the Maple River. A chiseled X on the NE wingwall, 0.2 feet lower than the deck elevation.
M-105 <sup>1/</sup>	1101.28	Approximately 6 miles south and 3.5 miles west of Alice, Cass County, ND. Between Sections 16 and 21, T137N, R55W. On the bridge over the Maple River, a chiseled square on the NW wingwall.

<sup>1/</sup> Reference marks established by SCS.

<sup>2/</sup> Reference marks established by U.S.G.S.

R.M. No.	Elevation (MSL)	R.M.'s Description
M-108 <u>1/</u>	1110.13	Approximately 4 miles south and 3.5 miles west of Alice, Cass County, ND. Between Sections 4 and 9, T137N, R55W. On a bridge over the Maple River, a chiseled X on the NE wheel guard 0.5 feet higher than the bridge deck.
M-110 <u>1/</u>	1110.91	Approximately 3 miles south and 3 miles west of Alice, Cass County, ND. Near the SE corner of Section 33, T138N, R55W. A chiseled X on the west end of the north curb of the bridge over the Maple River.
M-112 <u>1/</u>	1110.97	Approximately 2 miles south and 3 miles west of Alice, Cass County, ND. On the bridge over the Maple River, between Sections 27 and 34, T138N, R55W. A chiseled X on the NE wingwall.
52 FWK <u>2/</u>	1132.544	Approximately 1 mile south and 3 miles west of Alice, Cass County, ND. Near the corner of Sections 21, 22, 27 and 28, T138N, R55W, 76 feet north and 50 feet east of crossroads. A standard tablet set in concret and stamped "52 FWK".
M-113 <u>1/</u>	1119.00	Approximately 2.5 miles west of Alice, Cass County, ND. Between Sections 15 and 22, T138N, R55W. A chiseled X on the bridge over the Maple River 3 feet east of the centerline of the bridge on north curb.
M-113A <u>1/</u>	1115.67	Approximately 1 mile north and 2.5 miles west of Alice, Cass County, ND. Between Sections 10 and 15, T138N, R55W. Top of the north bolt on the end of arch pipe on the Maple River.
55 WPR <u>2/</u>	1140.086	Approximately 2 miles north and 3 miles west of Alice, Cass County, ND. Near the corner of Sections 3, 4, 9 and 10, T138N, R55W, 205 feet north and 32 feet east of crossroads. A standard tablet stamped "55 WPR" and set in concrete.
M-114 <u>1/</u>	1125.85	Approximately 2 miles north and 2.5 miles west of Alice, Cass County, ND. Between Sections 3 and 10, T138N, R55W. A chiseled X on the west end of the north curb of the bridge over the Maple River.

1/ Reference marks established by SCS.

2/ Reference marks established by U.S.G.S.



<u>R.M. No.</u>	<u>Elevation (MSL)</u>	<u>R.M.'s Description</u>
M-115 <u>1/</u>	1123.24	Approximately 3 miles north and 3.5 miles west of Alice, Cass County, ND. On the bridge over the Maple River between Section 4, T138N, R55W and Section 33, T139N, R55W. A spike in the center pile of the NW wingwall 2.2 feet lower than the deck elevation.
M-116 <u>1/</u>	1128.41	Approximately 4 miles north and 3 miles west of Alice, Cass County, ND. Between Sections 28 and 33, T139N, R55W. A spike in a plank cap on the NW wingwall, 0.5 feet lower than the bridge deck.
UE <u>2/</u>	1132.04	Approximately 5 miles north and 3 miles west of Alice, Cass County, ND. Near the corner of Sections 21, 22, 27 and 28, T139N, R55W, 750 feet north of the crossroads on the west side of the road. A chiseled square on the SE concrete base of a transmission tower.
M-178 <u>1/</u>	1128.42	Approximately 6 miles north and 3 miles west of Alice, Cass County, ND. Between Sections 21 and 22, T139N, R55W. On the bridge over the Maple River on top of steel beam 3.5 feet SW of the SW corner of the bridge deck and 1.0 feet lower than the deck elevation.
M-180 <u>1/</u>	1131.02	Approximately 6 miles north and 2.5 miles west of Alice, Cass County, ND. Between Sections 15 and 22, T139N, R55W. A chiseled X on the west end of the north concrete curb 0.8 feet above the bridge deck of the bridge over the Maple River.
M-182 <u>1/</u>	1129.29	Approximately 2 miles west and 6.5 miles north of Alice, Cass County, ND. Between Sections 14 and 15, T139N, R55W. On the bridge over the Maple River. A spike in piling in the NE corner 0.6 feet lower than the deck.
M-184 <u>1/</u>	1132.15	Approximately 4 miles south and 2 miles west of Buffalo, Cass County, ND. On the bridge over the Maple River between Sections 11 and 14, T139N, R55W. A spike in the cap on the NW wingwall 1.3 feet lower than the deck.
M-187 <u>1/</u>	1134.29	Approximately 2 miles south and 2 miles west of Buffalo, Cass County, ND. On arch pipe over the Maple River between Section 2, T139N, R55W and Section 35, T140N, R55W. Top of the north bolt on the west arch pipe.

1/ Reference marks established by SCS.

2/ Reference marks established by U.S.G.S.

<u>R.M. No.</u>	<u>Elevation (MSL)</u>	<u>R.M.'s Description</u>
M-188 <u>1/</u>	1134.42	Approximately 2 miles west and 1.5 miles south of Buffalo, Cass County, ND. On the bridge over the Maple River, between Sections 34 and 35, T140N, R55W. A spike in cap on NW wingwall 0.5 feet lower than the bridge deck.
H-18 <u>2/</u>	1160.929	Approximately 3.2 miles west of Buffalo, Cass County, ND. Between Sections 21 and 22, T140N, R55W, 101 feet west and 50 feet north of the north rail of the railroad. A standard disk set in concrete and stamped "H-18".
M-193 <u>1/</u>	1140.90	Approximately 1 mile north and 2.5 miles west of Buffalo, Cass County, ND. Between Sections 15 and 22, T140N, R55W. Top and north end of west arch pipe (second corrugation) on the Maple River.
M-195 <u>1/</u>	1142.93	Approximately 2 miles north and 2 miles west of Buffalo, Cass County, ND. On the bridge over the Maple River between Sections 11 and 14, T140N, R55W. A chiseled X on the NW wingwall.
M-197 <u>1/</u>	1146.61	Approximately 3 miles north and 1.7 miles west of Buffalo, Cass County, ND. On the bridge over the Maple River between Sections 2 and 11, T140N, R55W. A spike in cap on the NW wingwall of bridge 1.0 feet lower than deck elevation.
M-198 <u>1/</u>	1144.65	Approximately 2 miles west and 3.2 miles north of Buffalo, Cass County, ND. On the bridge between Sections 2 and 3, T140N, R55W over the Maple River. A spike in the SW wingwall, 1.5 feet lower than the deck elevation.
M-201 <u>1/</u>	1149.21	Approximately 4 miles north and 3 miles west of Buffalo, Cass County, ND. On a bridge over the Maple River between Section 3, T140N, R55W and Section 35, T141N, R55W. A chiseled X on the centerline of the north concrete curb.
M-205A <u>1/</u>	1150.91	Approximately 6 miles north and 2 miles east of Tower City, Cass County, ND. On a bridge over the Maple River, between Sections 22 and 27, T141N, R55W. A spike in the NW wingwall 0.5 feet lower than the bridge deck.

1/ Reference marks established by SCS.

2/ Reference marks established by U.S.C.& G.S.



R.M. No.	Elevation (MSL)	R.M.'s Description
M-206A <u>1/</u>	1152.66	Approximately 7 miles north and 2 miles east of Tower City, Cass County, ND. On a bridge over the Maple River, between Sections 15 and 22, T141N, R55W. A spike in the cap on the NW wingwall 1.1 feet lower than the deck.
M-207A <u>1/</u>	1153.90	Approximately 8 miles north and 2 miles east of Tower City, Cass County, ND. On a bridge over the Maple River between Sections 10 and 15, T141N, R55W. A chiseled X on the NW concrete wingwall.
M-210 <u>1/</u>	1157.74	Approximately 9 miles north and 2 miles east of Tower City, Cass County, ND. On the bridge over the Maple River between Sections 3 and 10, T141N, R55W. A chiseled X on the NE wingwall.
M-216 <u>1/</u>	1156.63	Approximately 11 miles north and 1 mile east of Tower City, Cass County, ND. On the bridge over the Maple River between Sections 28 and 33, T142N, R55W. A chiseled X on the NW wingwall, 0.4 feet lower than the deck elevation.
UM-33 <u>1/</u>	1153.59	Approximately 12 miles north and 1 mile east of Tower City, Cass County, ND. On the bridge over the Maple River between Sections 21 and 28, T142N, R55W. A spike through bottle cap on the NW wingwall pile, 1.5 feet lower than deck
5 RWM <u>2/</u>	1154.380	Approximately 14 miles north and 1 mile east of Tower City, Cass County, ND. Near the corner of Sections 8, 9, 16 and 17, T142N, R55W, 60 feet south and 18 feet east of the intersection. A standard disk set in concrete and stamped "5 RWM".
M-119 <u>1/</u>	1158.58	Approximately 14 miles north and 1.5 miles east of Tower City, Cass County, ND. On the bridge over the Maple River between Sections 9 and 16, T142N, R55W. A chiseled X on the west end of the north wheel guard, 0.9 feet above the deck elevation.
UM-26 <u>1/</u>	1160.33	Approximately 3 miles west of Page, Cass County, ND. On the bridge over the Maple River, between Section 3, T142N, R55W and 34, T143N, R55W. A chiseled X on the north wheel guard at the bridge centerline 0.7 feet higher than the bridge deck.

1/ Reference marks established by SCS.

2/ Reference marks established by U.S.G.S.

<u>R.M. No.</u>	<u>Elevation (MSL)</u>	<u>R.M.'s Description</u>
M127 <u>1/</u>	1164.41	Approximately 4.5 miles west and 2 miles north of Page, Cass County, ND. On a bridge over the Maple River near the SW corner of Section 21, T143N, R55W. A chiseled X on the west end of the north wheel guard 0.9 feet above the deck elevation.
H-449 <u>2/</u>	1167.130	Approximately 5.5 miles west and 3 miles north of Page, Cass County, ND. Near the NE corner of Section 19, T143N, R55W, 77 feet south and 75 feet west of the road intersection. A standard disk set on a steel rod inside a 4 inch tile, 1.5 feet south of a metal witness post.

1/ Reference marks established by SCS.

2/ Reference marks established by U.S.C. & G.S.



TABLE 1

## ELEVATION REFERENCE MARKS

## MAPLE RIVER FLOOD HAZARD ANALYSES

## (BUFFALO CREEK, CASS COUNTY)

<u>R.M. No.</u>	<u>Elevation (MSL)</u>	<u>R.M.'s Description</u>
30 RWM <u>2/</u>	971.758	Approximately 4 miles north and 0.8 miles west of Chaffee, Cass County, ND, 0.2 miles east of the NW corner of Section 27, T139N, R53W, 60 feet SW along the railroad and 45 feet SE of the railroad from the intersection. A standard tablet set in concrete and stamped "30 RWM 1965".
B-3 <u>1/</u>	964.56	Approximately 4.1 miles north of Chaffee, Cass County, ND. between Sections 22 and 23, T139N, R53W. On a bridge over Buffalo Creek. A chiseled X on the NW wingwall.
31 RWM <u>2/</u>	947.401	Approximately 4 miles north and 2 miles east of Chaffee, Cass County, ND. Near the NE corner of Section 25, T139N, R53W, 130 feet south of the bridge and 36 feet west of road centerline. A standard tablet set in concrete and stamped "31 RWM 1965".
B-10 <u>1/</u>	943.66	Approximately 4 miles north and 1 mile west of Lynchburg, Cass County, ND. Near the corner of Sections 19, 20 and 30, T139N, R52W. On a bridge over Buffalo Creek. The top of a bolthead on the NW corner of the bridge deck.
B-13 <u>1/</u>	936.92	Approximately 3.5 miles north of Lynchburg, Cass County, ND. Between Sections 28 and 29, T139N, R52W, on a bridge over Buffalo Creek. A chiseled X on the NW concrete wingwall.
B-14 <u>1/</u>	939.22	Approximately 2.75 miles north of Lynchburg, Cass County, ND. Between Sections 32 and 33, T139N, R52W, on a metal arch pipe over Buffalo Tributary. A chiseled X on top of the west end.

1/ Reference marks established by SCS.

2/ Reference marks established by U.S.G.S.

<u>R.M. No.</u>	<u>Elevation (MSL)</u>	<u>R.M.'s Description</u>
UE <u>2/</u>	932.80	Approximately 3 miles north and 1 mile east of Lynchburg, Cass County, ND. Near the corner of Sections 27, 28, 33 and 34, T139N, R52W. On a bridge over the Buffalo Creek. Near the SE corner of the bridge deck. A copper nail with washer.
B-21 <u>1/</u>	931.55	Approximately 6 miles south of Casselton, Cass County, ND. Between Sections 26 and 27, T139N, R52W on state Highway #18 bridge over the Buffalo Creek. A chiseles X on the NW wingwall.
B-24 <u>1/</u>	923.84	Approximately 2 miles west of Durbin, Cass County, ND. Between Sections 35 and 36, T139N, R52W on a bridge over the Buffalo Creek. A chiseled X on the NW wingwall of the bridge.
B-26 <u>1/</u>	922.25	Approximately 1 mile west and 0.5 miles north of Durbin, Cass County, ND. Near the NE corner of Section 36, T139N, R52W on a bridge over the Buffalo Creek. A chiseled X on the north end of the west curb, 1.0 feet above the bridge deck.

- 1/ Reference marks established by SCS.  
2/ Reference marks established by U.S.G.S.



## APPENDIX H

### BIBLIOGRAPHY AND REFERENCES

1. Hydrology - Section 4. August 1972. National Engineering Handbook. Soil Conservation Service. U.S. Department of Agriculture.
2. Guidelines for Determining Flood Flow Frequency. Bulletin #17A of the Hydrology Committee, Rev. June 1977. U.S. Water Resources Council. Washington, D. C.
3. Water Resources Data for North Dakota. Annual Reports. U. S. Geological Survey. Water-Data Report.
4. Extra Territorial Jurisdiction. North Dakota Century Code. Section 40-47-01. 1975.
5. Water Resources Council, United States. Regulation of Flood Hazard Areas, Vols. 1 and 2. Washington, D.C.: United States Government Printing Office, 1971 and 1972.
6. A Perspective on Flood Plain Regulations for Flood Plain Management. Department of the Army, Office of the Chief of Engineers, Washington, D.C., 1976.
7. Flood Proofing Regulations. DOA, OCE, Washington, D. C., 1972.







R0000 854687



R0000 854687